Thermally Thinking

the editors

Shying Away From Red Tape

Washington

THE "story behind the story" on Petroleum Administration for Defense backtracking on its apparent desire to control service restrictions on industrial gas consumers in areas in which supply shortages may develop is that PAD officials decided such responsibilities would entail tremendous red tape, and a corresponding increase in staff workers.

Actual decision of PAD to keep "hands off" the controversial task of judging how essential an industrial gas-user is, when he is essential and when he isn't, and other ramifications, was made by C. Pratt Rather, Assistant Deputy Administrator of the PAD, concurred in, of course, by PADministrator Oscar Chapman.

It was considered a new example of how closely the Department of the Interior is cooperating with the gas industry.

Mr. Rather, chairman of the Gas Industry Advisory Council, whose members gathered here for a meeting in early November, pointed out that PAD had considered tackling the problem of cut-offs only because the agency, through the Defense Production Act, had been made responsible for assuring adequate supplies of natural and manufactured gas to meet defense production needs.

He pointed out that the purpose of a proposed PAD general order setting forth the order of curtailment of gas supplied to those industries which normally operate under "interruptible" gas contracts would be to conserve the standby fuel—fuel oil, coal, or liquefied petroleum gas—in shortest supply in any particular area. He said that the purpose was never considered to be to "firm up" interruptible contracts. Plants served under such contracts *should* maintain adequate stocks of standby fuels, he said.

Blanket Order Out

The council also discussed the possibility of establishing priorities for curtailment of firm industrial loads in cases in which gas shortages might threaten service to domestic consumers.

After full discussion, it was agreed that it would be extremely difficult to draft a general order classifying industries in terms of essentiality in the defense effort. Some firms in the industry might be engaged in defense work while others in the same industry might not, it was pointed out. Thus one glass plant might be producing fiberglass for Navy life jackets while another nearby turns out soft drink bottles. Moreover, any one plant might be working on defense orders one day and on less essential orders the next.

The discussion also made it clear that historically the gas industry, through authority from the Federal Power Commission, has generally had freedom of action in selecting plants for cut-offs when necessary to protect service to domestic consumers.

Mr. Rather summed up the consensus of the meeting by saying that it appears that any order classifying industries on the basis of relative essentiality would be inflexible, might put the gas industry in a straightjacket, and might do more harm than good. In cases in which gas suppliers encounter difficulties in maintaining service to defense plants, it might be preferable for PAD to issue directives to individual companies in order to protect them, but such directives would be tailor-made to meet specific local problems, based on full consultation with local suppliers and other federal defense agencies involved.

Industry's Responsibility

Industry representatives assured PAD officials that the industry fully recognizes the importance of maintaining defense production. Gas companies, they said, will make every effort to avoid curtailments of service which would interrupt defense production.

PAD's final decision is both a compliment to gas management—implied, if not expressed openly—and a tribute to the tremendous gas storage plans and performances that have marked the natural gas industry in recent years, for implicit in this whole problem is the question of whether or not gas *could* be had for industry and domestic users. Apparently, gas management to a large degree has met the challenge, and only extreme unseasonable, long bitter cold weather could bring any great problem in this direction.

The "hands off" policy throws a corresponding responsibility on the local gas companies, particularly in areas in which shortages may develop. The officials of these companies now must study more closely the character of industrial operations they serve, so as to prepare a reasonable basis for cutting off service, if the need should arise. In the states in which regulatory commissions have volunteered under the Bow Amendment to take over this responsibility, PAD expects the state commissions to handle the problem—many of them, likely, in the same way that PAD has handled it—by allowing companies wide leeway in their actions.

Reconverting The Inches

Another subject that brought much discussion—and now final conclusion—at PAD's Gas Industry Advisory Council meeting was the possibility, under all-out war conditions, of returning the Big Inch and Little Big Inch pipelines to Uncle Sam for transportation of petroleum products. This is the result of a request from the Munitions Board that a study be made of the problem of moving large quantities

of oil to the east coast under extreme emergency conditions. Already, incidentally, the Defense Transportation Administration has stated that some 15 million private automobiles would have to be parked—for lack of oil and gasoline—in case of an all-out war.

Mr. Rather did not comment on the manner in which discussion of the controversial "reconversion" of the two major pipelines turned in the council. The National Petroleum Council previously had refused to make a proposed study of what would have to be done in case such drastic action were taken.

Under the sale terms of the Inch lines for gas use, Uncle Sam reserved the right to have the two pipelines reconverted to oil use, in an emergency. The impact of such a move under present, or even general war, conditions would have a seriously dislocating effect on the supply pattern of the natural gas industry. Since PAD officials realize this—probably as clearly as gas company management—it isn't likely that the drastic measure ever would be taken except as a "last resort" to keep the war machine running—in case things ever get that bad. Nonetheless, the discussion has had the effect of putting the gas industry on notice that emergency plans must be made, just in case.

Entanglements with FPC

Washington observers saw in a case before the Federal Power Commission another example of how PAD might be involved in questions of gas supply normally reserved to the FPC itself.

The possibility showed up in an FPC hearing involving the renewal of a gas supply contract between the Panhandle Eastern Pipe Line Co. and the Michigan Consolidated Gas Co. Present contract between the companies ends at midnight, Dec. 31, and Panhandle is seeking to curtail the amount of gas it will be obligated to supply in a new contract, arguing that its increasing demands from other customers, with heavy defense industry commitments, make it necessary to cut down the supply of gas to MichCon, which also has other sources of supply. Such an issue usually is settled in FPC, of course.

However, both Gov. G. Mennen Williams, of Michigan, and U. S. Sen. Blair Moody (D.-Mich.) have warned that such a curtailment in the contract would substantially impede the defense effort in the Detroit area. If so, this raises the question of national security — which is under PAD jurisdiction. Panhandle insists that it is willing to bow to any emergency orders which PAD might choose to issue, but still wants the contract to call for less gas. FPC order might be contingent on possible future emergency orders from PAD, whose officials are silent on the issues raised. Both PAD and FPC officials agree that on the issue of specific defense needs for gas supply, PAD has paramount authority under the Defense Production Act.

Subtlety and Balance

FOOTBALLICALLY SPEAKING, GAMA's public relations team is now on the offensive. Having made a stirring goal line stand against PAD's space heating order last summer, its offensive platoon has gone into action and has a steady drive going. Its attack is showing a subtlety and balance that can only come with having old pros on the team.

The old pros (from GAMA's PR agency) are providing their own scouting sheets in the form of newspaper-format monthly reports, labeled *GAMA Gas Lines*. The latest one to hit this desk is Vol. 1, No. 3 (the October issue, which Uncle Sam's fleet-of-foot carriers braved snow, rain, heat, and gloom of night to rush to us by Nov. 3), and here are some of the new plays it diagrams, verbally:

The Silent Box. This is a series of stories designed to help the customer understand what makes a gas meter "tick." The meter's unfailing accuracy and long-lived dependability and the unerring accuracy of the men who spend their lives reading it are the themes of this group of stories. The Byoir agency even dug into files for a history of the meter to give the stories a little extra zip. The human interest appeal, though, is the strong point.

Pilot Lights Don't Heat Up the Kitchen. Debunking a "popular supposition that has generated considerable sales resistance to gas appliances," GAMA points out that ice cubes in the making actually give off more heat than a gas range pilot (300 Btu against 200); that mopping the floor generates 759 per hour, and that when you get hot under the collar because your partner trumps your ace you are putting out 350 Btu.

Proving the Essentiality of Gas Ranges and Space Heaters. Two brochures for Congressmen explain why these two appliances are basic to the economy and health of the nation and why, therefore, they should have careful consideration in materials allocations. "Gas Ranges as a Part of Our National Defense" and "Fifty Percent of America's Homes Are Heated by Space Heaters" are the titles. These brochures are backed up with releases to newspapers and other publications bringing the facts to the attention of the public as well.

More Money for More Gas. How rate increases are needed to permit expansion of the industry and to help utilities build to meet peaks without load interruption is the subject of this series of stories.

Even the Blind Can Cook With Gas. Reasoning that if handicapped persons can be shown using gas appliances, the general public can be made to recognize their inherent safety, GAMA cooperated with the American Foundation for the Blind in staging dramatic pictures as the opening shot in this campaign. Further stories about teaching homemaking to the blind are planned.

Spokesman for Whom?

These are only a few of the many new plays in GAMA's book. New formations are constantly being developed. With material like this GAMA is likely to hang onto the ball for a good long time.

Admirable as GAMA's efforts are, however, there seems to be some question as to the healthiness of the situation. Several critics have hastened to point out that GAMA is appearing to be the spokesman for the gas industry as a whole. This was particularly evident during the enfoldment of the PAD space freeze-Bow amendment drama in July and August, and all through the fight over whether a New York utility was responsible for servicing gas appliances in the face of mounting customer fatalities. Since there can never be a *complete* community of purpose between GAMA and AGA, it would appear that the latter must become a more articulate spokesman for the *utility* side of the industry.

Unfortunately, there doesn't seem to be even a community of purpose among the individual companies making up the membership of the AGA.

A solution to this latter situation may be in the making. The AGA is starting to talk (see p. 35). It has organized a public relations committee to study the possibilities of a national public relations program. But it's still talking in whispers, and we understand that there is some difference of opinion among committee members as to whether an industry-wide program is needed.

The real, basic need is a policy. The AGA has no clear-cut public relations policy at present. When situations arise, the staff must go it alone. The information bureau is merely an information bureau, nothing more.

Here's a start, as enunciated by James F. Oates of Peoples Gas, Chicago, at the St. Louis convention (quoting in part):

> Every company should be encouraged, *if possible by force of industry opinion*, to formulate a program that meets the needs of the particular company and community, including (a) the maintenance of highest standards of service, (b) the merchandising of quality appliances, (c) the economic education of employees and public, (d) the control of costs, (e) the truth about the safety of gas.
>
> The AGA can and should provide leadership, factual data, patterns of programs, expert staff guidance.

Technical Trends

guy corfield

Carbonized Lignite Competitive With Natural Gas?

ACCORDING to a recent announcement, a development of interest to the gas industry is taking place in Milam county near Waco, Texas, wherein the Texas Light & Power Co. will build a power plant to supply an adjacent reduction works of the Aluminum Co. of America with electricity produced by combustion of processed lignite. This use of lignite, which is based on research by the U. S. Bureau of Mines at its Denver laboratories, assertedly makes available a fuel which is on a par with natural gas at 5 to 8 cents per Mcf, and is therefore directly competitive in many areas where both natural gas and low grade coals occur.

The lignite is converted to a powder or char, with tar as a by-product, and the char is burned directly under steam boilers. The tar can also be burned, or may subsequently have higher by-product value. Alcoa expects to get its electricity at from 3.5 to 2.5 mills per kwh, depending on the value realized from the tar. The project will use 7000 tons of lignite daily to produce 3200 tons of char and 2300 bbls of tar, in a 12-unit plant costing $9 million.

The process, which is self-sustaining thermally, consists of feeding crushed raw lignite into a stream of hot combustion products in which it is fluidized and heated to about 300° F to evaporate moisture. Then the hot dried dust is conveyed pneumatically to the base of a vertical "carbonization reactor" wherein, again using fluidization and more process gas, it is converted into char and tar which enter the top of a separating and storage chamber.

The tar is taken off at the top of this chamber and condensed and the char settles to the bottom from which it is conveyed, in the stream of process gas, to the burners of the steam boiler. The char has a heating value of 10,600 Btu per lb and the process gas 150 Btu per cu ft. A carbonization temperature of 900° F has been found to produce the best type of char and ratio of char to process gas.

Combustion

CONSIDERING THE IMPORTANCE of heat to mankind throughout the ages and the vital interest that the gas and other fuel industries have in the phenomena of combustion, it is surprising that so little is known about its basic mechanisms and fundamentals. As recently stated by Bernard Lewis and Guenter von Elbe of the U. S. Bureau of Mines, internationally recognized authorities on combustion, "expansion of fundamental research . . . (during the period 1948-50) . . . reflects the generally felt need for sound scientific concepts in the approach to combustion problems. With this concentration on the basic aspects one may expect that in time fundamental science can be applied successfully to those complex practical problems that now permit only empirical investigation."

Anyone interested in this subject would do well to obtain a copy of the September 1951 issue of *Industrial and Engineering Chemistry*. In a section devoted to chemical engineering unit processes is a 17-page treatise by Lewis and von Elbe which might well be regarded as the *start of a file or library on combustion*. After an introduction on fundamentals it discusses such subjects as ignition, propagation and stabilization of flames in pre-mixed gases under conditions of laminar and turbulent flow, detonation, temperature and equilibrium state of combustion gases, gas burners (including interchangeability), furnaces, and prevention and control of fires and explosions. It also furnishes a bibliography of 834 references to articles, papers, books, etc.

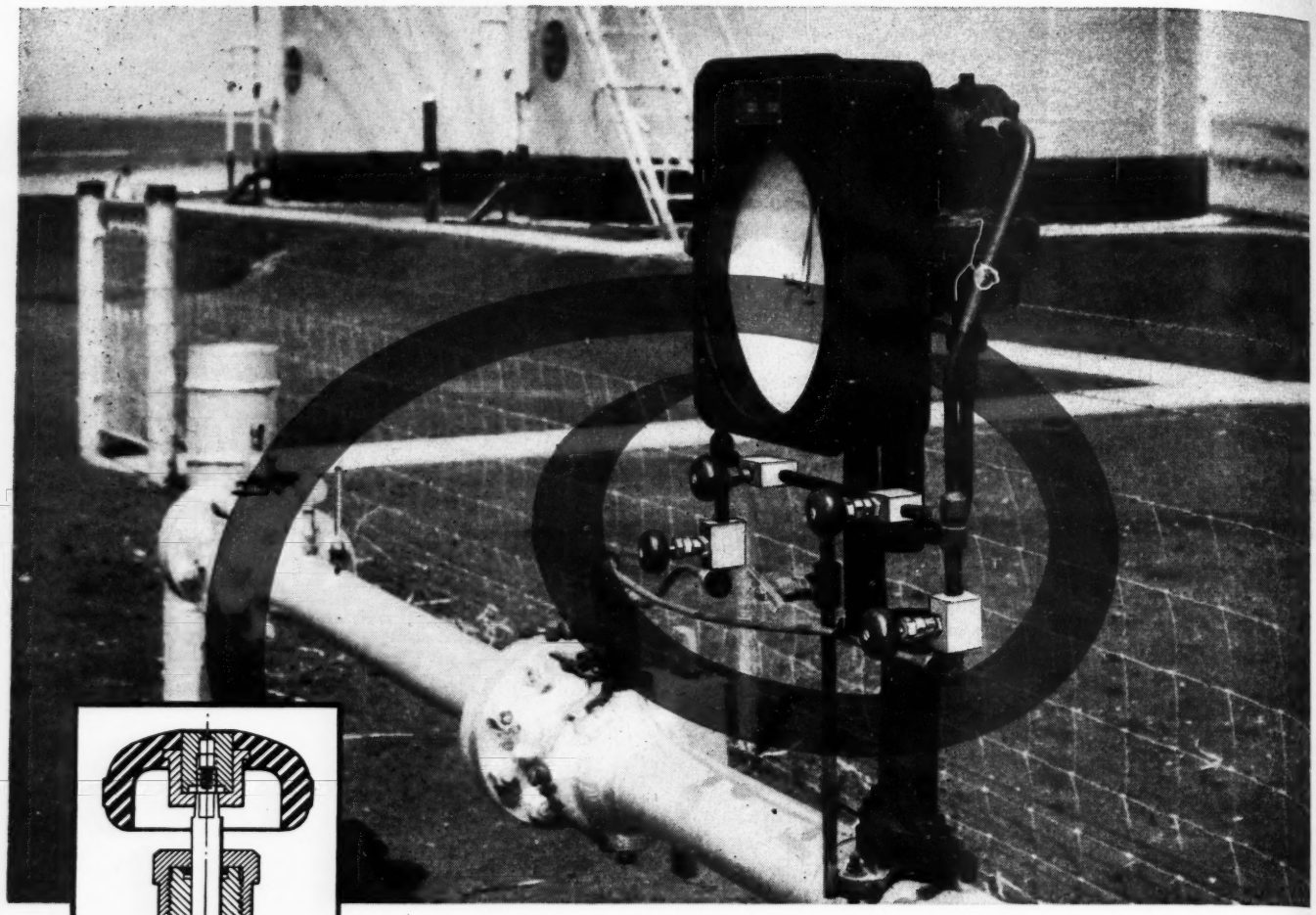
Also in this same issue is a paper by M. G. Zabetakes, G. S. Scott, and G. W. Jones, also of the U. S. Bureau of Mines, on "Limits of Inflammability of Paraffin Hydrocarbons in Air." This paper describes the apparatus used and results of an investigation of the *effect of elevated temperature on the lower limit of inflammability of paraffin hydrocarbons in air*. The results showed an average decrease of 8% in the lower limits of flammability for a 100° C rise in temperature of the gas-air mixture above "room" temperature of about 26° C. The hydrocarbons below hexane were apparently not studied but the trend would indicate that while the lower limits of flammability of methane and ethane are 5.0% and 2.9% respectively at about 80° F, these limits would be 4.6% and 2.7% respectively at 260° F.

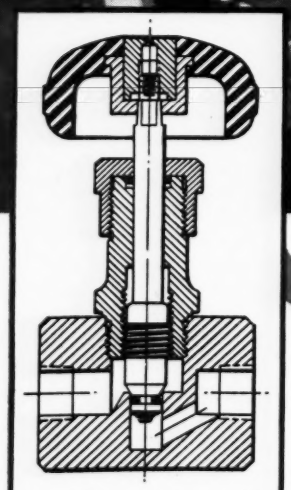
A third paper in this *Industrial and Engineering Chemistry* issue is entitled "Blowoff of Flames from Short Burner Ports," by Channing W. Wilson and Norval J. Hawkins of Consolidated Gas Electric Light & Power Co. of Baltimore. This paper outlines a study of the *form of the burner ports of typical gas appliance burners, and character of fluid flow of gas-air mixture through them*, with respect to the concept of a "critical boundary velocity gradient" at the limits of the stable flame region, which may be used to *correlate the occurrence of blowoff*.

This concept has been previously studied and discussed by several investigators for long tubular burners, but not for the very short "tubes" that comprise typical gas burner ports. Ethylene and propane were used as test gases. The data appear to provide valuable additional information on combustion behavior, to assist the study and prediction of interchangeability.

Maintaining Safety Record

A YEAR AGO (see this page for December 1950) the National Fire Protection Assn. issued a summary of fire losses during 1949, which showed that "gas and appliances" were the cause of only 1% of the fires. NFPA's report for 1950 has just appeared with practically identical figures, indicating that again gas was responsible for approximately 1% of the fire loss — 7800 fires out of a total of 600,000 or, costwise, $9 million loss out of a total of $699,600,000.





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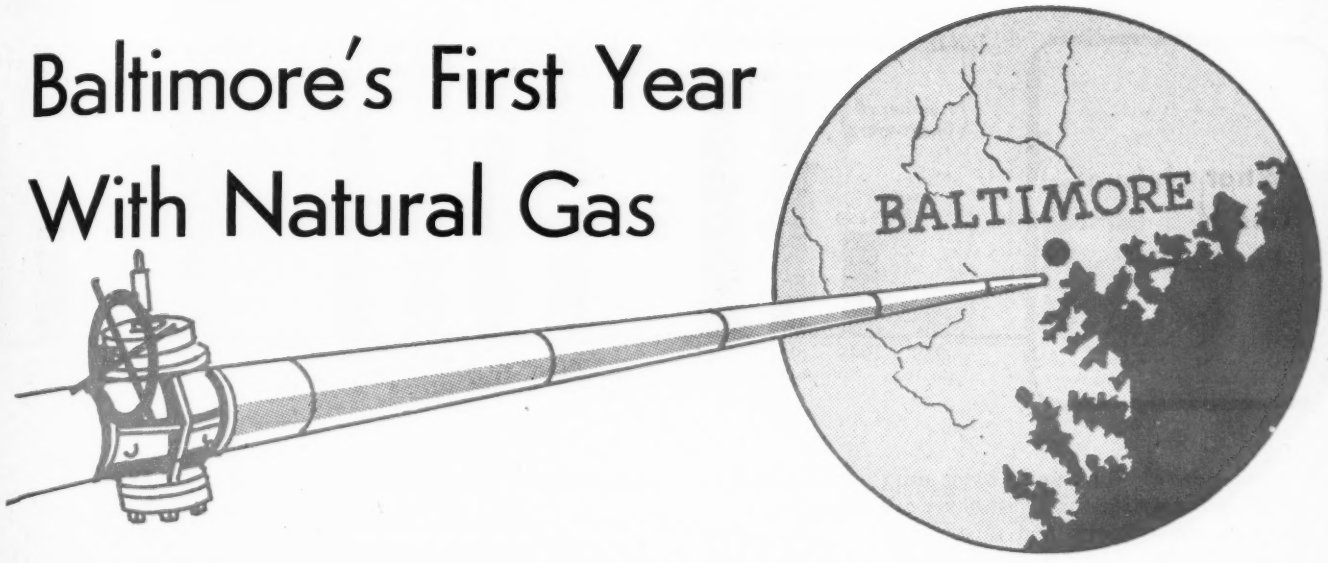
Baltimore's First Year With Natural Gas



By CHARLES P. CRANE
Consolidated Gas Electric Light & Power Co.
Baltimore

BALTIMORE has been supplied with natural gas for a little over one year. Conclusions based upon such limited experience are usually risky and frequently erroneous. You may be sure that I have kept this in mind, and recognize that certain fundamental factors of business—particularly taxes and labor costs—are governed by forces over which the public utility distributor has no control.

A bit of history about our Baltimore gas business may serve to highlight the developments which led us into the natural gas field. We claim to be the first chartered gas company in the western hemisphere. An ordinance authorizing the lighting of the city by means of "carbureted hydrogen gas" and empowering the Gas Light Co. of Baltimore "to lay pipe along the streets, squares, lanes, and alleys of the city for that purpose" was enacted in June 1816.

The gas and electric businesses in Baltimore were merged in 1906 and it was the relatively affluent gas company in those days which supported the embryonic electric business. Within one decade after the merger, however, electric revenues exceeded those of the gas division which latter now constitute nearly one-third of our total gross.

The motivation of our company's changeover to a natural gas supply may be found in the drastic decline in gas earnings which began in the second half of the 1930's. From the time of the merger in 1906, practically all of our electric and gas rate changes had been downward and because of this, and other reasons, our management was reluctant to increase gas rates, notwithstanding the urgent need.

Presented at the AGA convention, St. Louis, Oct. 15-17.

In fact, it took the approach of a near catastrophe in net gas earnings, which had shrunk from $3.1 million in 1930 to $376,000 in 1946, to overcome our reluctance. And when we did increase our gas rates in 1947, we found it expedient to make a somewhat greater coincidental decrease in our electric rates. This, of course, brought closer to a parity the cost of electric and gas cooking in our territory and likewise affected the relationship between the economic value of gas and electricity in industry, which didn't simplify our gas problem by any means.

The increase in gas rates approved by the Maryland Public Service Commission in 1947 could not cope with the continued rise in costs thereafter, and in 1949 it was again necessary to increase by approximately 11½% both gas and electric rates. *Table 1* shows in five-year jumps from 1930 to 1945 and for the individual years 1946, 1947, 1948, and 1949 the controlling statistics of our gas operations, and indicates how imperative it had become to find some effective means of improving the financial results from gas operations!

If we had not raised our gas rates and established a fuel rate adjustment in 1947, we probably would not have been able to cover gas operating expenses in that year.

The Search Begins

And so in the middle 1940's we took up the study of securing a natural gas supply for Baltimore. Forty years previously and again in 1916 there was considerable discussion of natural gas for our city, but our low gas production costs in those days, made possible in part by a supply of by-product gas from the large Bethlehem Steel Co. plant near Baltimore, enabled us to produce a mixed gas which, Btu for Btu, was as cheap as the natural product offered us. Of course, the greatly increased oil and coke prices, labor costs and taxes which developed in the late '30s and '40s, and the relatively static position of natural gas rates, changed this completely.

As a first step in our preliminary investigation of natural gas, we engaged the services of Ford, Bacon & Davis Inc. which rendered invaluable service to us, not only in making preliminary surveys and establishing contacts with natural gas suppliers, but later in proceedings before the Federal Power Commission, in designing facilities for the natural gas tie-in line, and in locating the most suitable right-of-way for its passage through Baltimore.

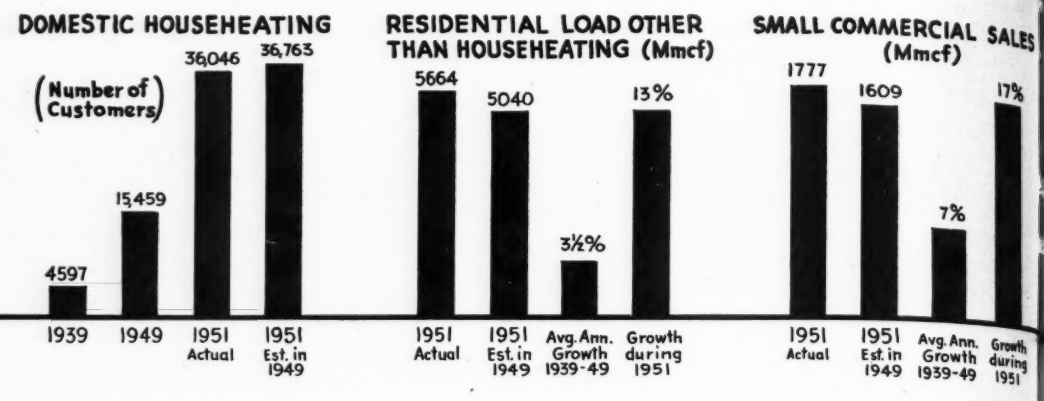
After we had carried on negotiations with three other systems, we reached an agreement with the Columbia Gas System. Atlantic Seaboard Corp., a subsidiary of Columbia Gas, had owned since the early 1930's a transmission line running from Boldman, Ky., to Rockville, Md. (near Washington), and thence past Baltimore to a point of juncture with other Columbia lines near Coatesville, Pa.

After Columbia had managed to contract for additional southwestern gas, they applied in January, 1948, to the Federal Power Commission for authority to run a 26-in. transmission line from West Virginia to Washington. The commission was advised that this line was necessary to provide for increased supplies to Washington and would also make it possible to take on Baltimore.

After lengthy hearings, the Federal Power Commission approved Columbia's new line and on July 27, 1949, authorized a natural gas supply for Baltimore of 70 MMcf per day, with lesser quantities during an 18-month development period. Approval of this project by the federal authorities immediately set in motion a series of important steps by our company.

These included the submission of our natural gas plans to the Public Service

What Natural Gas Has Done For Baltimore



Commission of Maryland; explaining the advantages of natural gas to city authorities, newspapers, and other leaders in our community; securing a right-of-way for the 15-mile tie-in line from "Granite Gate station" in Baltimore county to our Spring Gardens gas plant; awarding a contract for a 26-in. main which cost us (installed) $2,252,000, including lateral connections and terminal equipment; dividing our distribution system into 68 "blocks" and installing necessary sectionalizing valves, so that, at the proper time, each block could be isolated in a manner which would permit it to be (a) shut off from the rest of the manufactured gas system. (b) purged of manufactured gas, and (c) supplied by the incoming natural gas. Generally speaking, we desired to bring in the natural gas from the perimeter of our city and then advance block by block until we reached our downtown sections.

On Aug. 25, 1949, we contracted with Conversions & Surveys Inc. (a Stone & Webster subsidiary), for the changeover of our distribution system. The first section was converted to natural gas within eight months and the whole territory in about 12 months from the date of the contract.

Thus it will be seen that in the eight months between the awarding of the changeover contract to Conversions & Surveys and the scheduled commencement date of May 1, 1950, that organization was obliged to recruit and train a force which at its peak exceeded 1200 men. The beginning of the changeover was scheduled for May 1 in pursuance of our decision not to carry on this work while residential gas furnaces were in operation. We advertised a completion date of Sept. 7 with the thought that the work would be finished before the advent of the fall heating season.

I am happy to report that Conversions & Surveys, with assistance from our company forces, changed over 85% of the sections with no departure from the advertised schedule dates, and were successful in having our entire territory on natural gas by the terminal date of Sept. 7.

The initial estimate in our cost-plus contract with Conversions & Surveys was for $3,742,000, but the final cost reached $4,118,000 due to wage increases and our desire to do a somewhat more extensive job than we had originally considered necessary. The portion of the work handled by our company forces, including publicity and insurance, cost $958,000, making a total expenditure of $5,076,000. We changed over approximately 305,000 meters and the expense per meter was $16.64.

Success of Publicity

In addition to the punctuality attained in completing our conversion block by block, it is of interest to know that due to our newspaper, mail, and radio publicity, it was necessary to dig up and shut off at the curb only 104 services where customers were away from home on the advertised conversion day; that we experienced neither a fatality nor a serious accident as a result of our conversion; that there was an insignificant number of reports of "mysterious disappearance" of articles from customers' houses; and finally, that good customer relations were maintained on a plane which we had not thought possible of attainment during such an extensive operation.

We believe that a most important factor in smoothing the way for the introduction of natural gas into the Baltimore territory was the offer which our company made publicly and repeatedly to reduce gas rates by $7.5 million annually if the natural gas supply was secured at the time and on the terms proposed in the Federal Power Commission hearings.

The company fulfilled its promise in this respect, the new and lower rates having become effective immediately as each section was changed over.

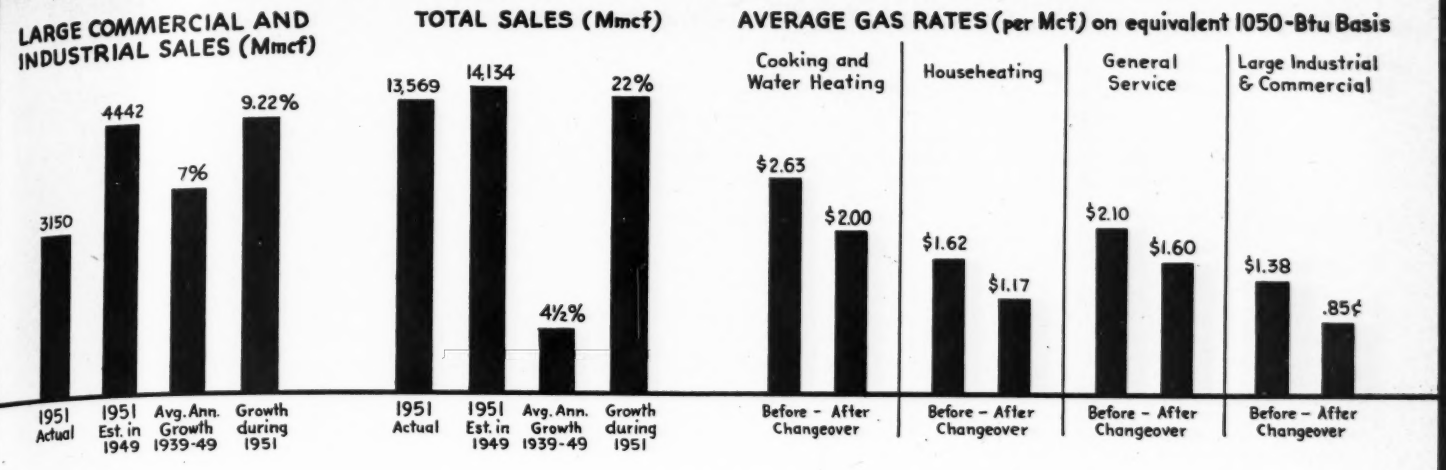
Of course, it must be borne in mind that our rates for manufactured gas had been increased in 1947 and in 1949, but the reduction of $7.5 million practically offset these two rate increases.

We passed our first year's milestone in natural gas distribution during the early part of September. Actually, however, this understates somewhat our experience with natural gas, because we began using modest quantities for cracking and cold-mixing just as soon as our tie-in main was completed in January 1950. And as previously mentioned, as each "block" or section was completed, those customers went on natural gas service.

With the large rate reduction in prospect, we did not expect a spectacular rise in gross earnings immediately or in the rate of earning power on our gas property. However, we did prepare estimates in 1949 which indicated considerable growth in the volume of Mcf sales and a gratifying improvement in financial results. These estimates covered the calendar-fiscal years 1951, 1952, 1953, and 1954, and having been made in 1949 were predicated upon tax rates and labor costs then prevailing. In comparing these 1949 estimates with our actual results in the current year, it is necessary to use actual figures for the first eight months of 1951 and apply recent estimates covering the last four months.

Load Growth

Domestic Househeating. In 1949 we estimated that by the end of 1951 we would have 36,763 domestic househeating customers on our system. At the time the estimate was made, we had 15,459 such customers and the aggregate growth during the preceding ten-year period was 10,862. The actual number of domestic househeating customers signed up by the end of August 1951 was 30,326 and we now expect a total of 36,046 by the end of this year. While this number is 717 less than our estimate made in 1949, it is nevertheless 133% greater than the total number of such customers at the time we made the estimate. It is estimated that currently approximately 80% of the new homes constructed adjacent to our distribu-



tion system are using natural gas for heating.

Our company does not sell heating equipment for new homes, but we do compete in the market for converting old homes from other fuels to natural gas. Our company has not yet extended itself in this latter field. We have been proceeding somewhat cautiously so that we would not create run-away conditions which might exceed our natural gas commitment. Our average rate per Mcf for househeating sales is $1.17. We believe when all elements are taken into account, including the use of electricity for oil burner, maintenance, and service charges, etc., natural gas at our prevailing rates is sufficiently competitive with oil at 12.2 cents per gal. and service charges of $15 or more per year.

However, the Oil Heat Assn. has been trying to persuade our public to believe that the overall cost of gas heat is 28% more than the overall cost of oil heat, by omitting their service charge and using other data with which we do not agree. The Maryland Public Service Commission has issued an order patterned on the recent PAD order under which our company will be permitted to take on 16,770 additional househeating customers between Aug. 23, 1951 and Sept. 5, 1952. This will be about in line with our planned expansion as estimated in 1949.

From our first year's experience, it has become apparent that househeating, regardless of its low load factor, must be counted a prime avenue for expansion of our gas business in Baltimore.

Residential Load Other Than Househeating. In 1949 we estimated that our natural gas sales in 1951 for residential purposes other than househeating would total 5040 MMcf. Our latest calculation for 1951, based on eight months actual and four months estimated, shows 5664 MMcf, which is 12.3% higher than estimated in 1949. The average annual growth in this particular load during the ten-year period ended 12/31/49 was 3½%, whereas we believe the growth in 1951 alone will be 13%.

This year's improvement is due mainly to the greater number of customers on our gas distribution system with some stimulation of consumption induced by the lower natural gas rates. Residential use per customer, exclusive of heating, rose sharply after natural gas was introduced, but now appears to have reached a plateau considerably above the former levels with manufactured gas.

Small Commercial Gas Sales. The estimate for the year 1951, as made in 1949, contemplated a total sales volume of 1609 MMcf. We believe our actual 1951 sales for this type of load will aggregate 1777 MMcf. Our average yearly gain during the 1939-1949 period was 7%. The 1951 growth is expected to be about 17% over 1950. This includes some commercial heating.

Large Commercial and Industrial. We do not expect to meet the 1949 forecast on this type of load, notwithstanding the fact that we have since connected a large additional volume of such business to our lines. The failure to reach our goal has been due to several reasons:

1. The men in our industrial fuel department, during the year 1950, were devoting the major portion of their time to assisting Conversions & Surveys in changing over specialized industrial equipment for the use of natural gas. Consequently, during the greater part of the year, they were not able to concentrate on the development of new industrial load.
2. In a number of instances where our men were able to secure contracts for new load, in 1950 and 1951, industrial customers were delayed in securing equipment needed to permit the planned use of natural gas in their operations.
3. There have been some drastic decreases in industrial consumption during 1951 due to cutbacks in production caused by the shortage of metals and materials reserved for the defense program. These decreases have not yet been offset by increased defense production.

The average yearly increase in large commercial and industrial load, during the ten-year period ended 12/31/49, was 7%. In our 1949 forecast, we assumed that the increase with natural gas in 1951 alone would be 54%, or a total use during the year of 4442 MMcf. Our present view is that we will reach 3150 MMcf, which exceeds any increase secured in years before natural gas became available.

Total Gas Sales. It now appears that total gas sales in 1951 will be about 4% less than we had expected when we made the estimate in 1949. This is due, of course, to the industrial situation which I have just explained. Total sales during the 1939-1949 period showed an average annual growth of 4½%. We now expect a total sales volume for 1951 of 13,569 MMcf which would be 22% above 1950 sales.

Total Revenue. Total gas operating revenue in 1951, we believe, will exceed by $100,000 the forecast we made in 1949. This expected increase in gross revenue coincident with the anticipated decrease of 4% in sales volume is due of course to the under-run of lower rate industrial sales and the greater sales to higher rate residential and small commercial customers.

Operating Income. It is not feasible at this time to be too specific about operating income from gas operations, but I would like to point out that we were using a 38% tax rate when we made our 1949 forecast as contrasted with a probable 52% rate for three-quarters of 1951, and that we have made two general wage increases since the 1949 forecast. Without these additional burdens, we would undoubtedly have exceeded substantially our 1949 estimate.

In any event, the operating income at the end of the first full year with natural gas should be better than for any year since 1934. Using the excellent gain in 1951 as a basis, we would need perhaps two additional years of similar improvement, if tax rates and other basic cost factors remain at present levels, before our gas property reaches its maximum permissible earning power.

Rates. I have stated that our company made reductions in gas rates, coincident with the changeover to natural gas sup-

TABLE 1. Gas Operation Statistics

	Total Manufacturing Cost of 500-Btu Water Gas, Per Mcf	Total Production Cost of 500-Btu Gas, Incl. By-Product Coke Oven Gas, Per Mcf	Average Receipts Per Mcf Sold	Cost of Coke Delivered Per Ton	Cost of Oil Delivered Per Gal.	Net Earnings from Gas Operations
					(Gas Oil)	
1930	25¢	20¢	75¢	$ 6.80	4¢	$3,091,000
1935	19¢	18¢	72¢	6.97	4¢	2,684,000
					(Heavy Oil)	
1940	20¢	19¢	69¢	7.55	3¢	1,457,000
1945	33¢	28¢	68¢	12.62	4¢	1,075,000
1946	36¢	32¢	68¢	14.58	4¢	376,000
1947	45¢	41¢	83¢*	16.59	6¢	987,000*
1948	54¢	50¢	95¢*	18.81	7¢	1,276,000*
1949	45¢	42¢	99¢**	20.14	6¢	2,191,000**

*Rate increase and fuel rate adjustment effective in April 1947.
**Second rate increase effective in May 1949.

ply, which have effected savings to customers of $7.5 million annually. About $4 million was in reduced base rates and the remaining $3.5 million in the complete elimination of the fuel rate adjustment that applied under our manufactured gas rates. In the overall, we reduced rates by an average of about 28%.

Some measure of the reductions by classes can be obtained from comparison of these rates before and after natural gas. The manufactured gas rates have been adjusted to a 1050-Btu basis in these comparisons.

Our residential customers using manufactured gas had been paying for cooking and water heating an average rate of $2.63 per Mcf stated in terms of 1050-Btu gas. The new natural gas schedule reduced this to $2, a decrease of 24%. Individual reductions ranged from about 13% for the small users of around 500 cu ft per month to over 30% for the larger cooking and water heating customers. We reduced our rates for residential heating from $1.62 per Mcf (on the basis of 1050 Btu) to the present $1.17 per Mcf, or by 28%.

Our small general service customers were reduced from an average of $2.10 per Mcf to an average of $1.60 per Mcf or by 24%. Here again reductions ranged from about 18% for the smaller users of 1500 cu ft per month to 27% for larger users of around 35,000 cu ft per month.

The rates to large commercial and industrial customers were reduced from an average of $1.38 per Mcf (on an equivalent 1050-Btu basis) to an average of 85 cents per Mcf, or by 38%. The reductions in this class ranged from 25% for users of 50,000 cu ft per month to 40% and better for users of 5 MMcf or more per month.

General Comments

We have not encountered so far any real difficulty in the supplying of natural gas to our customers. Our gas service calls during the first nine months of 1951 showed a normal average of about 0.43 calls per meter, which is approximately one-half of what they were during the corresponding period of the conversion years. The customer reaction has been excellent; the appliance adjustments now seem to be on a satisfactory basis notwithstanding somewhat different burning characteristics; and we have not had any trouble with meter diaphragms and caulked gas main joints drying out.

Our good fortune in this respect may be due in some measure to our long-continued practice of using "dipping meters"—that is, meters in which we have injected a thin layer of oil. Two months before conversion commenced we began oil-spraying all of our principal distribution mains. This has been continued and is now supplemented by oil-fogging and odorizing all incoming natural gas and humidification of our low pressure sendout.

We have not had any trouble with gas regulators in most of which we use synthetic diaphragms. Our "unaccounted for" gas continues at less than 5%. During the early months of 1951 we conducted intensive surveys to determine leakage in manholes. The leaks we found were neither more numerous nor more serious than with manufactured gas. We believe our relative freedom from an excessive amount of difficulty with respect to leaks and so-called "dust storms" has been due to the conditioning of our distribution system both before and after conversion.

We are using 5 light "A" and "M" gas meters in most residences for cooking, water heating, and househeating. The higher heat content of natural gas has enabled us to avoid using 10 light meters in the usual size residence with a gas furnace thus conserving capital investment.

I am not at this time able to give any worthwhile statistics on the extent to which natural gas has reduced our capital outlays for distribution system extensions. Theoretically, the distribution of 1050-Btu gas in place of the 500-Btu which we formerly produced doubles the capacity of our mains, services, and holders. But the large increase in our total sendout has shown up bottleneck conditions in certain specific areas where the growth has more than doubled due to the acquisition of househeating. These conditions had to be rectified and new mains have been required to reach recently built developments on the urban fringes and in suburban sections. While I cannot give appropriate data, there is little doubt that either our capital outlays for system extensions would have been much greater with 500-Btu gas, or if they were not greater, it would be because we could not have secured the same amount of new business.

I am of the opinion that no utility executive could change his company over from manufactured gas without seriously considering what the future offers with natural gas. At the moment it can be delivered in eastern cities at less than one-half the cost of producing an equivalent oil gas. Besides minimizing investment for plant and distribution system, it has a popular appeal because it is associated with lower rates and stimulation of industry. It is non-toxic and avoids the grim notoriety arising from the use of manufactured gas for self-destruction.

The lower rates made possible by the use of natural gas enable much keener competition with electricity, oil, propane, and coal in industry. The considerable outlay for conversion can be amortized over a period of ten years. From all these and many other standpoints, natural gas possesses undoubted economic advantages over manufactured gas. But there are other matters which require deep thought and decision.

There is the matter of continuity of supply and availability of additional gas for growth. I know we gave lengthy consideration to possible breaks in the supplier's transmission main; abnormal conditions requiring curtailment of supply; rationing during national

emergencies; and dependence upon the supplier, and he upon his suppliers, for gas necessary to support continued growth by the local distributor.

Not only the adequacy of supply must be considered, but also the future price. Our first year had hardly passed before an application was filed by our supplier for an 11% increase in our gate rate. Coincidentally, we are faced with the probability of curtailment next winter because of the national defense program, which has obstructed pipeline companies from securing steel pipe with which to supplement their natural gas deliveries.

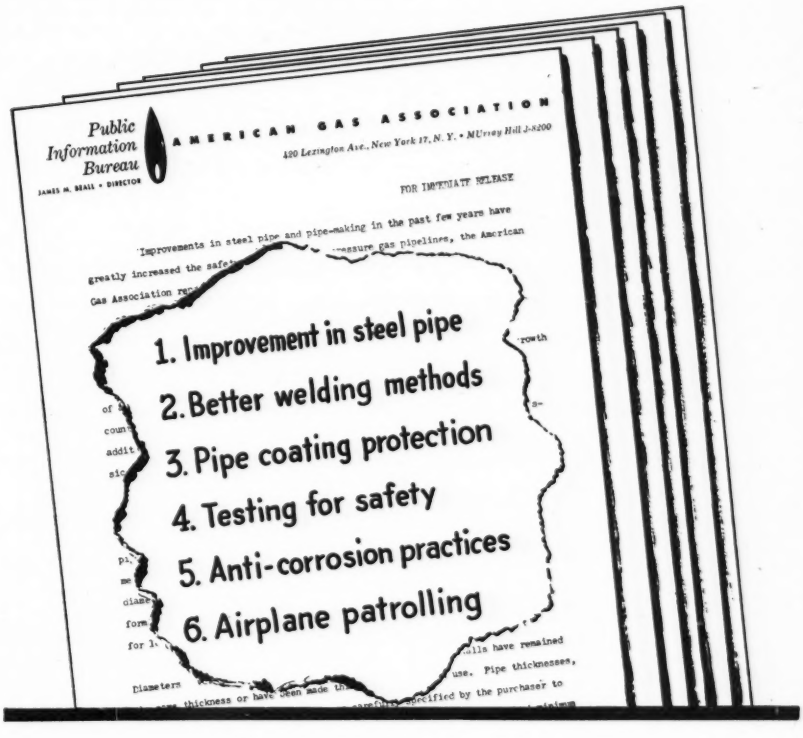
Curtailment Worry

We Baltimore people are apprehensive of the natural gas suppliers' traditional procedure for effecting peak-day curtailments through drastic reductions of industrial consumption. Each eastern utility man must decide for himself whether his industrial customers can be induced to use natural gas in preference to other fuels where such interruptions to their operations may be involved and the economies to be gained from natural gas are on a much less attractive basis than in areas where lower gas rates prevail.

We have endeavored to meet some of these problems in Baltimore by converting our gas-making equipment to the production of 1000-Btu oil gas, at a cost of approximately $40,000 per set. We now have a total of 23 oil gas sets, with a rated capacity of 116 MMcf per day. This by no means dispels all of the uncertainties to which reference has been made, but it does give us a comfortable feeling that our peak loads can, for some years at least, be protected except in catastrophes.

You realize, of course, that our company could not justify supplying through extended periods high-cost oil gas in substitution for lower cost natural gas unless rates were increased substantially. But we would certainly endeavor to do so in relatively brief emergencies. Our converted plant is also useful in peak shaving our maximum demands, which is currently being done at a gratifying saving in the demand charges for natural gas.

Looking at this matter on a long-range basis, and realizing the extent to which additional cities are calling for natural gas, one cannot but wonder whether it is not only prudent but indeed essential to adapt existing gas plant facilities to the production of a substitute natural gas. Certainly, if the expanding market for natural gas outruns the supply in the years to come, some means must be found of providing for continuity of service and future growth.


Public Information Bureau
JAMES M. BEALL • DIRECTOR
AMERICAN GAS ASSOCIATION
420 Lexington Ave., New York 17, N. Y. • MUrray Hill 3-8200
FOR IMMEDIATE RELEASE
1. Improvement in steel pipe
2. Better welding methods
3. Pipe coating protection
4. Testing for safety
5. Anti-corrosion practices
6. Airplane patrolling

AGA Tells The Public

"Gas Is Safe" Campaign Started

AGA has begun to apply a six-dose mouthwash to rid the public of that dark brown taste that the mention of gas has brought in certain quarters in recent months.

The gas-caused deaths in New York, the Rochester disaster, the Pittsburgh tragedy, and scattered examples of exploding pipelines have brought on a wave of unfavorable publicity on a wide scale. Scattered—but nationwide — reactions against gas have resulted.

To combat ths situation and to bring the truth to the public, AGA last month announced that it was issuing a set of six articles to newspapers throughout the country. Their single theme: The gas industry is building and operating lines in the safest manner possible.

At present, only high-pressure gas lines are covered. The six articles cover the following:

1. Improvement in steel pipe. This release covers the adoption of advanced techniques in fabrication, including longitudinal welding of pipe, cold working techniques, the use of mild alloy steel; mill-testing under hydrostatic pressure and the imposition of high standards under the code for pressure piping of the American Standards Assn. Field tests under pressure and cold bending are also explained.

2. Better welding methods. This story explains how welds, and welders, are checked daily through methods including X-ray inspections; and tells of the new specifications being developed by AGA and API.

3. Pipe coating protection. Handling of the pipe and the use of holiday detectors are covered as well as the mechanics of wrapping and its benefits.

4. Testing for safety. Pressure tests are described here in some detail.

5. Anti-corrosion practices. Cathodic protection and the causes of corrosion are discussed in understandable language.

6. Airplane patrolling. How leaks can be found from the air, and how the reporting and repair of these leaks are coordinated for speed is told.

To date AGA has remained mum on the New York situation, since it is "unique in that it is made up of a combination of factors not present in the same degree in other parts of the country." However, AGA's director of public information, James M. Beall, did say that a great deal of information has been collected on the subject.

Other releases will be developed on other phases of gas safety in the near future, he promised.

Announcement of the program was incorporated in Mr. Beall's report to the AGA publicity and advertising committee, detailing accomplishments since July. Activities included the preparation of 28 press releases, a monthly mat service, convention releases, aid to newspapers for special issues built around gas and to magazines for special stories ("The Eternal Flame—Natural Gas," in the October issue of *The National Geographic Magazine,* for example,) and extensive industrial and commercial publicity work.

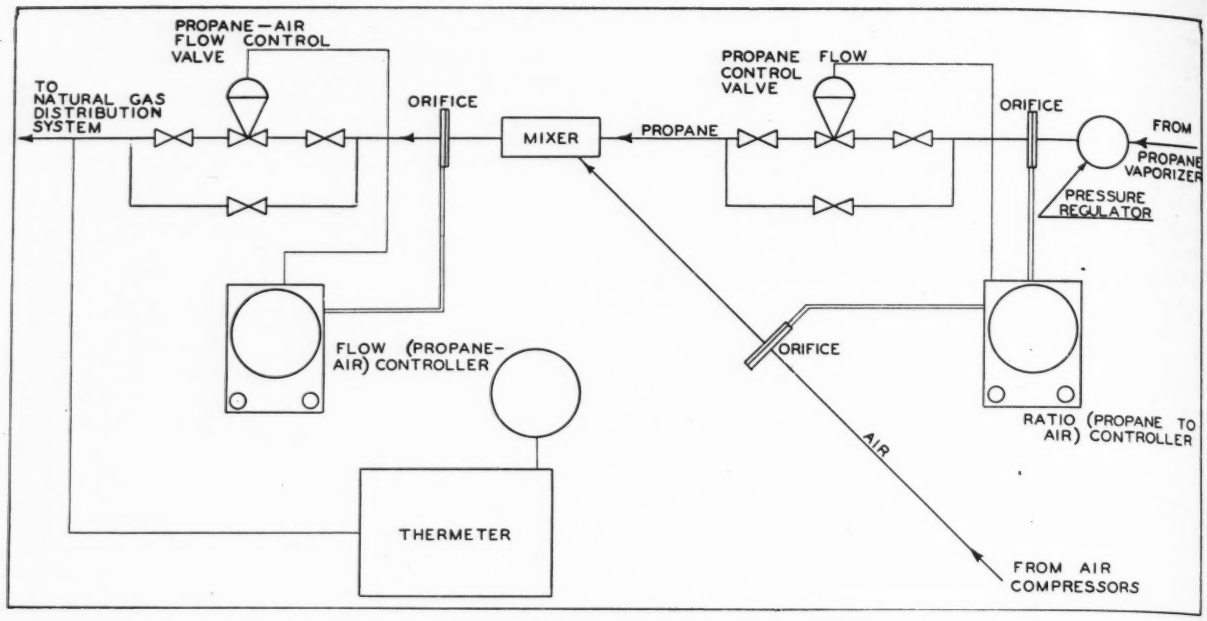


Fig. 1. Schematic line diagram of Gas Light Co. of Columbus' peak shaving plant showing flow of propane and air through orifices and control valves.

Georgia Peak Shave Plant Uses Orifice Flow Control

By G. J. TANKERSLEY
Gas Light Co. of Columbus (Ga.)

WHAT we believe to be a new approach to the method of control and mixing of propane and air in peak shaving plants is incorporated in the plant of Gas Light Co. of Columbus, Ga. The plant, completed Dec. 20, 1950, had a successful winter's operation. The company contracts for gas from its supplier on a demand and commodity rate, and at the rate of return realized last winter in demand charge saving, the plant will amortize in a five-year period.

Exclusive

The plant is designed to deliver 240 Mcf/hr of 50-50 mixture of propane-air at a temperature of 60 psig. By using orifice measurement in conjunction with a flow controller, ratio controller, and automatic control valves, the plant will automatically and accurately proportion the propane and air to a 50-50 mixture and maintain any desired flow from 50 to 240 Mcf/hr.

The 50-50 mixture is maintained by a ratio controller and one butterfly valve in the propane line (see *Fig. 1*). There are no controlled valves in the air line. A flange tap orifice is incorporated in both the air and propane line. Both of the orifices are connected to the ratio controller which either opens or closes the butterfly valve in the propane line in order to give a 50-50 mixture of the two. This is a ratio control that is instantaneous.

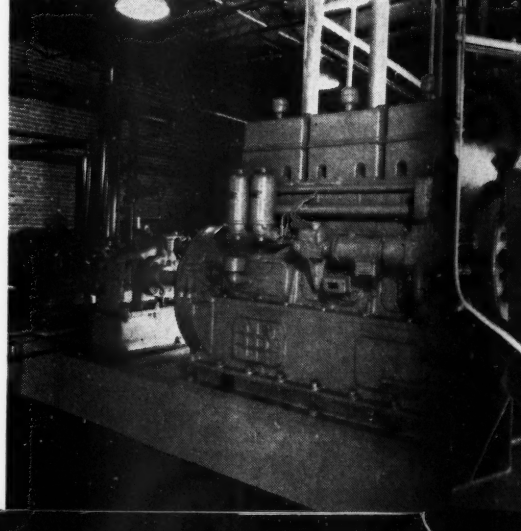
The ratio controller determines a lack of air (which increases Btu of the made gas) or a surplus of air (which decreases Btu of the made gas) by a decrease or increase in the flow across the orifices and closes or opens the butterfly valve in the propane line to bring the mixture to 50-50 ratio. If other than 50-50 mixture (around 1300 Btu) is desired, the operator can manually reset the ratio controller to the desired mixture (for example, 60-40). This is a 2-pen recording instrument which gives a 24-hour chart of propane and air flow in Mcf.

The propane and air are mixed in a mixer fabricated on the job from an 8-in. pipe with alternate baffling. The air enters the mixer in the top at a 60° angle with the longitudinal axis of the mixer. The propane enters along the longitudinal axis of the mixer.

The propane-air gas flow is controlled by a flow controller *(Fig. 1)*. The mixed gas passes through a flange tap orifice that measures the flow of gas, which is controlled by the action of the flow controller on a butterfly valve. The plant operator indicates at the beginning of the run the flow of gas he desires, i.e., 50,000 cfh, 175,000 cfh, etc., by setting the set pointer on the flow controller (located in the control room) to the desired flow. As the set pointer is advanced, the flow controller allows air pressure to open the butterfly valve to the flow required and maintains this flow indicated at a steady flow until such time as the plant operator changes the set pointer to a new flow.

The operation of maintaining a constant flow is, simply, a flow decrease (under that indicated by the set pointer) measured by the orifice and interpreted by the flow controller to allow the butterfly valve to open, thereby permitting more gas to flow. When the sensitivity of the instrument is

Fig. 2. Air is supplied by two two-stage rotary compressors equipped with intercoolers and after-coolers.



properly adjusted, changes of flow by the plant operator will not result in the instrument "hunting."

The flow controller is also a recording instrument which gives a chart for record of flow of the propane-air for a 24-hour period.

The air is supplied by two Fuller two-stage rotary compressors equipped with inter-coolers and after-coolers *(Fig. 2)*. The after-cooler reduces the air temperature after the last compression to 75 to 80°F (winter operation). The compressors are driven by two Buda natural gas engines, which are equipped with Minneapolis-Honeywell pressure controls that reduce and advance engine speed with a rise or fall of air pressure from the control pressure (60 lbs) in the air receiver.

Automatic Controls

A 100-hp, low pressure (15-lb) boiler provides steam for the propane vaporizer (see *Fig. 3*). The boiler is equipped with on-and-off controls and safety features which allow it to operate unattended. The pilot lights on the boiler provide sufficient heat to keep the water in the boiler hot during the time the plant is on a standby basis. The forced draft fan on the boiler is the only piece of equipment in the plant which is dependent on electricity, with the exception of the thermeter (and this is not essential to the automatic functioning of the plant). In order that operation of the boiler be independent of electricity, in case of power failure, air is taken from the air receiver at receiver pressure and is reduced by regulator to 12 in. w.c. before being introduced into the scroll of the fan. This standby air supply is ready for instant use to supply air for the boiler burners in case of an electric outage.

Instruments in the control room *(Fig. 4)* are ratio controller, flow controller, various pressure gauges, thermeter, and a gravitometer. The gravitometer measures specific gravity of the mixture of propane-air and natural gas that is sent to the city.

The compressors and boiler are located in a separate building and during operation this building is unattended except for a periodic check of engine temperatures, etc. The propane vaporizer, orifices, mixer, and control valves are located in the building which also houses the control room. The control room and vaporizer-mixing compartment *(Fig. 5)* are separated by a vapor-proof partition. Both buildings are of brick and steel construction.

A number of safety features have been incorporated in the plant. All piping is aboveground and color coded. Automatic closure of main flow lines in event of fire is provided. The tank storage area has an effective sprinkler system and personnel can walk from the valve area on the tanks to the valve dome on the tank cars by means of a counterweight catwalk.

The propane-air plant is built on a site which has been used for various manufactured gas sets from 1854 to 1950 (natural gas was introduced in 1931). All piping was designed aboveground so as to avoid the possibility of a leak of the heavier gas accumulating in old underground pockets. The pipe is easy to maintain and service; leaks, if they were to develop, would be readily noticed.

Color Identification

The color code based on ASME recommendations for color identification of piping is:

Yellow	propane vapor
Green	air
Orange	liquid propane
Blue	steam
Yellow with green stripe	propane-air
Yellow with black stripe	natural gas
Red	fire protection

The plant will run infrequently and this color identification is an aid to the operators who have other duties when the plant is not in operation.

A hydraulically actuated Shand and Jurs valve is located in the liquid line from the storage tanks to the vaporizer and in the propane-air line from the vaporizer house to the natural gas distribution system. These are valves that are held open under hydraulic pressure. The pressure is maintained by an "operator" in the control room. Fusible plugs located in the vaporizer-mixing compartment will melt in event of a fire, releasing the hydraulic oil and closing these two valves. Also, the valves can be closed instantly from the control room.

The tank storage area is effectively covered by a sprinkler system. An automatic quick opening water valve in the water supply line will open when the tank pressure rises to a predetermined point, releasing water to the spray nozzles. This is by-passed, as are all control valves in the plant, for manual operation.

Versatile Plant Design

This type of plant, first suggested as being feasible by L. S. Gregory of Tulsa, is simple in its operation and maintenance, and can (in the writer's opinion) be designed for any pressure and flow. The mixture and flow control depend only on volume of flow through the orifices. For plants in which a wide range of flow is desired, it appears that it would be possible to install twin propane and air runs with orifices and valves. An automatic changeover from the high flow run to the low flow run should accomplish a wide range of flow within accurate range of the orifice.

The tank storage is at present four 30,000-gal. water capacity tanks. This storage is being doubled and plans call for the addition of four tanks to be installed and filled this year.

Fig. 3. A 100-hp, 15-lb boiler which provides steam for propane vaporizer is equipped with special safety features.

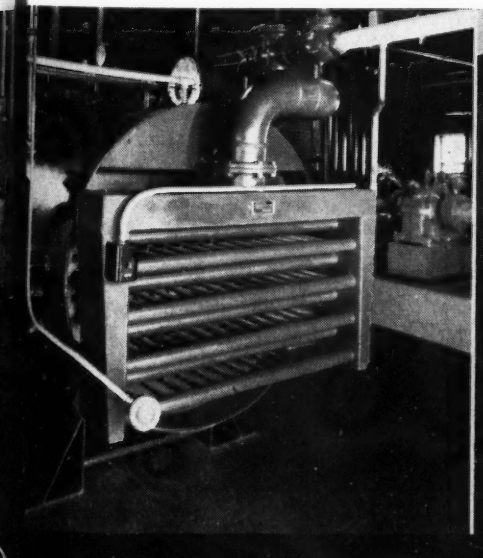
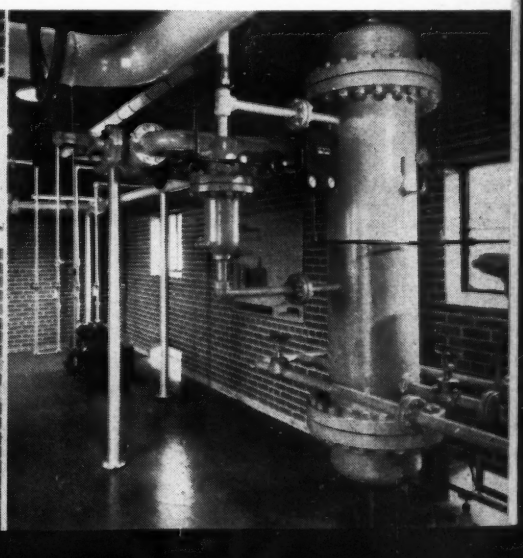


Fig. 4. Control room panel houses ratio controller, flow controller, pressure gauges, thermeter, and gravitometer.

Fig. 5. This vaporizing and mixing compartment is separated from the control room by a vapor-proof partition.



DOLLAR ECONOMICS

Of Gas Main Sizing

By W. J. LUTZ and J. H. MILLER
Public Service Electric & Gas Co., Newark

AMONG the characteristics of the gas public utility business is the fact that the utility company is obliged to lay mains to keep pace with the increasing demand and growth of its territory. These distribution mains constitute by far the largest single item of the fixed capital of a gas utility. In the case of Public Service Electric & Gas Co., it amounts to about 36%.

It is also an economic fact that the cost of cast iron gas mains is not directly proportional to the capacity as is nearly the case with other gas equipment such as compressors, turbines, motors, etc. For example, there is the large group of gas mains whose diameters bear the installed cost ratio of 2-to-3 but have the capacity ratio of approximately 1-to-2, i.e., for a 50% greater investment, 100% additional capacity is obtained. These relationships apply to the following size mains:

6-in.	diameter	versus	8-in.
12-in.	"	"	16-in.
24-in.	"	"	30-in.
30-in.	"	"	42-in.

There is a second group whose diameters bear the installed cost ratio of 3-to-5 and the approximate capacity ratio of 1-to-3, i.e., for a 67% greater investment, 200% additional capacity is obtained. These relationships apply to 8-in. diameter versus 12-in., and 16-in. versus 24-in.

Also, there is the special case of 4- and 6-in. mains whose diameters bear the installed cost ratio of only 3-to-4 and the approximate capacity ratio of 1-to-3, i.e., for a 33% greater investment, 200% additional capacity. This highly favorable relationship between cost and capacity is due to the fact that the capacity increases as the $\frac{5}{2}$ power of the diameter[1] while the installed cost ratio is more nearly directly proportional to the diameter.

Economics of Ratio

This fact, which has a definite long range bearing on costs to the gas utility company, may be overlooked by the distribution engineer when he is confronted with the economic problem of whether to lay a certain calculated commercial size main or the next size larger, if he does not give true weight to the total future carrying charges of both mains.

The engineering calculation of the main size to meet an estimated future load is generally based on a flow formula which takes into consideration values of the following factors:

1. Flow of gas in cubic feet per hour. (Contemplated changes in the Btu content of the gas must be considered.)
2. Pressures—initial and terminal.
3. Specific gravity.
4. Length of line.

No solution can be obtained until values have been assigned to the above factors. However, after a certain calculated commercial size has been agreed upon, it is necessary to investigate the dollar economics of this size and the next larger size. It is the purpose of this study to emphasize the necessity of making a comparison of the present worths of future annual costs of both size mains and to show that short-sightedness in selecting the main based purely on first cost may be expensive.

Graphic Solution

This cost comparison lends itself to a graphic presentation and solution. Since capital commands an annual rental (return), the time value of money must be recognized. In comparing plans or programs which include expenditures at future periods, the effect of compound interest must be recognized by comparing the plans on a present worth basis.[2] This results in a curved line relation.

Fig. 1 shows graphically the present worths of future annual costs through-

[1]Pole, Cox and Spitzglass formulas—Weymouth is $\frac{5.3}{2}$ power.

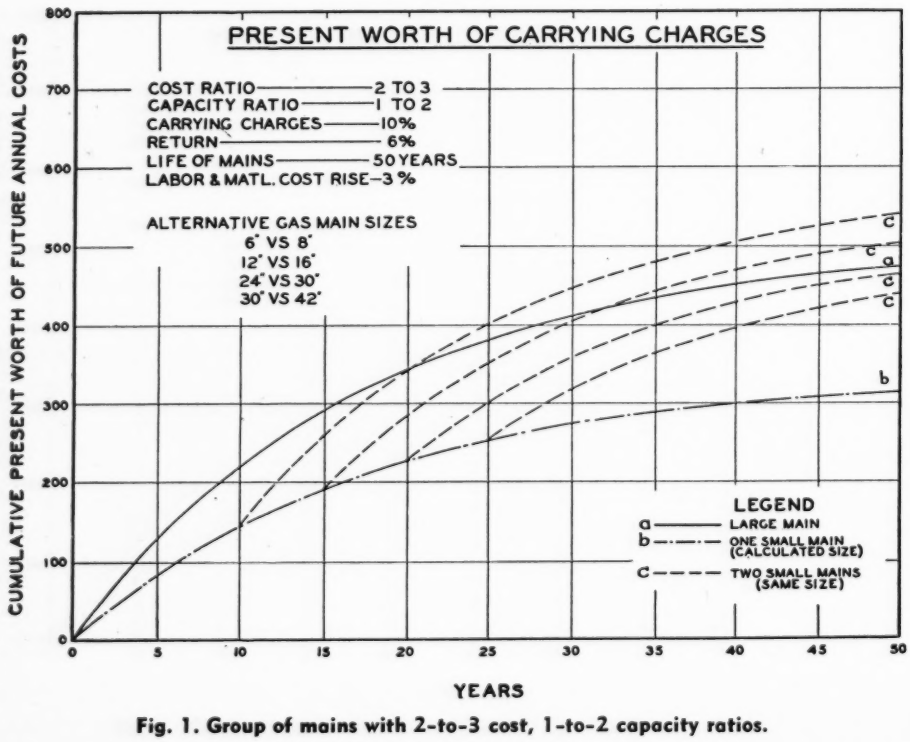


Fig. 1. Group of mains with 2-to-3 cost, 1-to-2 capacity ratios.

[2]See "Principles of Engineering Economy" by E. L. Grant.

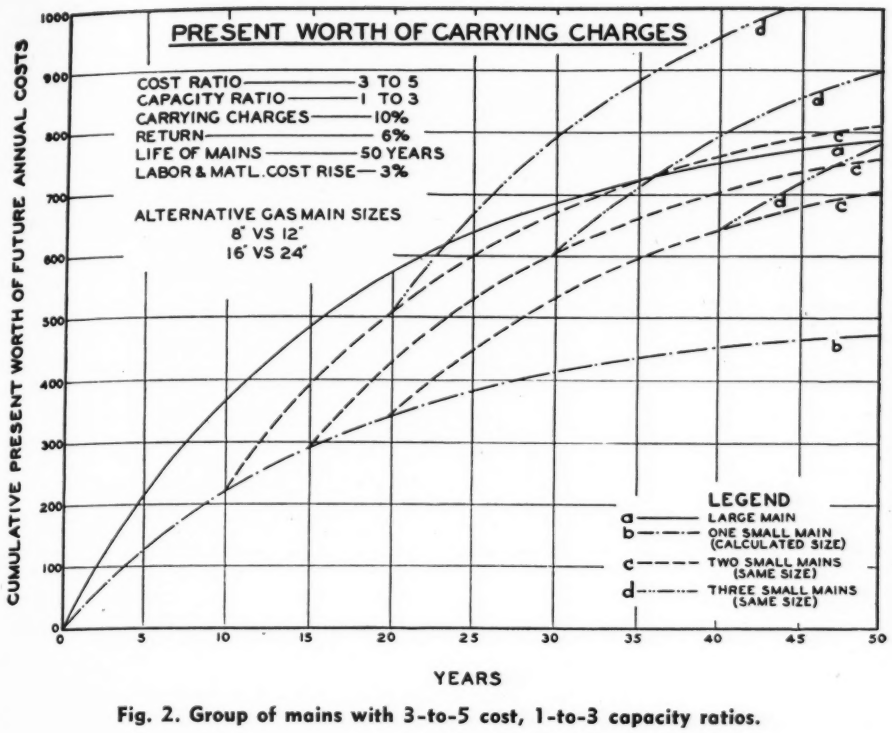

PRESENT WORTH OF CARRYING CHARGES
COST RATIO — 3 TO 5
CAPACITY RATIO — 1 TO 3
CARRYING CHARGES — 10%
RETURN — 6%
LIFE OF MAINS — 50 YEARS
LABOR & MATL. COST RISE — 3%
ALTERNATIVE GAS MAIN SIZES
8" VS 12"
16" VS 24"
LEGEND
a — LARGE MAIN
b — ONE SMALL MAIN (CALCULATED SIZE)
c — TWO SMALL MAINS (SAME SIZE)
d — THREE SMALL MAINS (SAME SIZE)
CUMULATIVE PRESENT WORTH OF FUTURE ANNUAL COSTS
YEARS

Fig. 2. Group of mains with 3-to-5 cost, 1-to-3 capacity ratios.

out the stated period of the calculated main and the corresponding larger main of the four groups listed, which have a cost ratio of 2-to-3 and a capacity ratio of 1-to-2. The ordinate of the curve represents present worth of future annual cost units. For example, if 200 units represent the investment cost of the calculated main, 300 units will represent the investment cost of the larger main (cost ratio 2-to-3). The abscissa represents years.

The present worth of future annual costs for the small main for 20 years calculated on a 10% carrying charge of which 6% is return on investment is 229 units.[3] Correspondingly, the present worth of future annual costs for the large main for 20 years is 344 units.

The 10% carrying charge used in these sample calculations is the sum of return on investment, depreciation, federal income taxes, and gross receipts taxes. As these components may vary with different gas public utilities, any specific calculation must be based on the values that apply to that company.

It is obvious that if the predicted load for the 50-year period can be met by the calculated main, there is no need to install the larger main and be burdened with the higher carrying charges over the 50 years.

However, if the predicted load exceeds the capacity of the calculated main before the expiration of its 50-year expected life, and it becomes necessary to lay a duplicate main, then the dollar economics of laying the larger main in the first place must be investigated. For example, if a calculated main reaches its peak capacity in 15 years and it becomes necessary to lay a duplicate main at that time, the carrying charges from then on will be for both mains.

If the past trend continues, the cost of the second main, laid 15 years later, will be higher than today. Cast iron pipe has more than tripled in cost in 50 years (actually 3.8[4]). This amounts to a 2.6% average annual increase. Common labor likewise has had more than a sixfold increase in wages from 1910 to 1947[4], which amounts to a 5.0% average annual increase.

For purposes of this study, a combined material and labor cost increase of 3% per year in the installed cost of cast iron gas mains has been assumed. This is reasonable in light of the past experience recorded above, and the fact that the cost of laying the second main years later will be higher because of encountering subsequently laid subsurface structures and more expensive street repaving.

Cost of Future Mains

The actual probable cost of the second main laid 15 years later will then be 312 units (compound interest factor at 3% per year for 15 years is 1.56) compared to 200 units today. Hence, the carrying charges of the two mains will be based on a total of 512 units instead of 400 units (two mains at 200 each) from that date on. The carrying charges for the large main are still based on the original 300 units.

In this example, the present worth of future annual costs for the two small mains based on a 10% carrying charge will exceed that of the large main at some future date. This is graphically shown on *Fig. 1* by line "c" starting at 15 years. It crosses line "a" (large main) at about the 32-year mark which is the "break-even" point, i.e., that point of time when the present worth of future annual costs of the large main are equal to the present worth of future annual costs of the two small mains.

[4]*Engineering News-Record.*

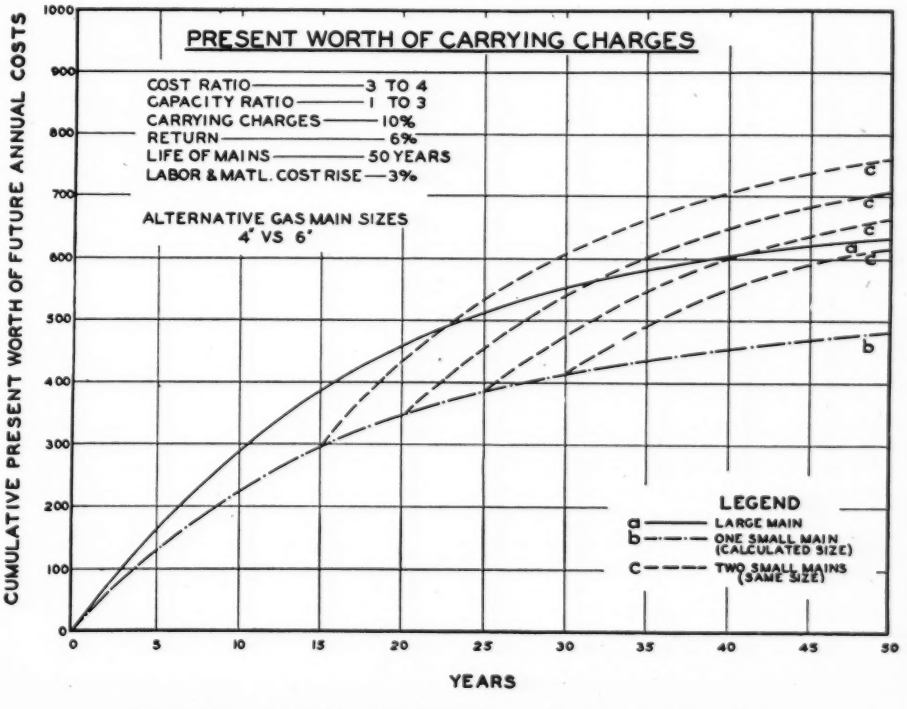

PRESENT WORTH OF CARRYING CHARGES
COST RATIO — 3 TO 4
CAPACITY RATIO — 1 TO 3
CARRYING CHARGES — 10%
RETURN — 6%
LIFE OF MAINS — 50 YEARS
LABOR & MATL. COST RISE — 3%
ALTERNATIVE GAS MAIN SIZES
4" VS 6"
LEGEND
a — LARGE MAIN
b — ONE SMALL MAIN (CALCULATED SIZE)
c — TWO SMALL MAINS (SAME SIZE)
CUMULATIVE PRESENT WORTH OF FUTURE ANNUAL COSTS
YEARS

Fig. 3. Group of mains with 3-to-4 cost, 1-to-3 capacity ratios.

[3]200 x 0.10 x 11.47 (present worth at 6% return of a 20-year annuity) = 229.

Prior to this break-even point the present worth of future annual costs on the large main are more than on the two calculated small mains but beyond it the financial balance is in favor of the large main. Since cast iron gas mains have an expected life of at least 50 years, there is a distinct saving in carrying charges from the break-even point to the end of the 50 years.

Break-Even Point

Similarly, *Fig. 1* shows the break-even point for one large versus two small mains based on different lengths of time during which the first small main is estimated to reach its capacity and a second duplicate main is required. A study of this curve shows that for the main sizes listed, which have a cost ratio of 2-to-3 and a capacity ratio of 1-to-2, it is cheaper in the long run in this example to lay the large main than to lay the small main, if it can be foreseen that the capacity of the small main will be reached prior to 20 years.

Fig. 2 is included to cover the second group of mains, which have a cost ratio of 3-to-5 and a capacity ratio of 1-to-3. A study of this curve shows that for the main sizes listed it is the economic choice to lay the large main if it can be foreseen that the capacity of the small main will be reached prior to 12 years.

Furthermore, there is still available in the large main the equivalent capacity of one small main since the capacity of the large main is three times that of the small one. This available capacity becomes of value only if the equivalent capacity of two small mains is exceeded, because the present worth of future annual costs of three small mains rises rapidly and reaches the break-even point in a few years as shown by lines marked "d" on *Fig. 2*.

Fig. 3 covers the case of 4-in. versus 6-in. mains which have the cost ratio of 3-to-4 and the capacity ratio of 1-to-3. A study of this curve indicates that it is cheaper in the long run under the assumed conditions to lay the 6-in. main if it can be foreseen that the capacity of the 4-in. main will be exceeded any time prior to 28 years.

Furthermore, there is still available in the 6-in. main the equivalent capacity of a 4-in. main since the capacity of the 6-in. main is three times that of the 4-in. main. It therefore follows that under the assumed conditions, a 6-in. main should be laid in place of the usual 4-in. low pressure main in the ordinary new business main extension, unless there are definite foreseeable limitations to the growth of the load.

In order to simplify the problem, the pumping and maintenance charges of the two plans under consideration have not been included in the computations. Since pumping costs are generally lower with a larger main, this saving would further favor the selection of the larger main.

Due consideration must also be given to the maintenance charges of the two alternatives. The maintenance cost for a single small main is generally lower than for the next larger size main. However, the maintenance cost for two or more small mains is generally higher than for one large main. The pumping and maintenance costs must be added to the carrying charges, and then the totals compared on the basis of the present worth of these future annual costs.

Conclusion

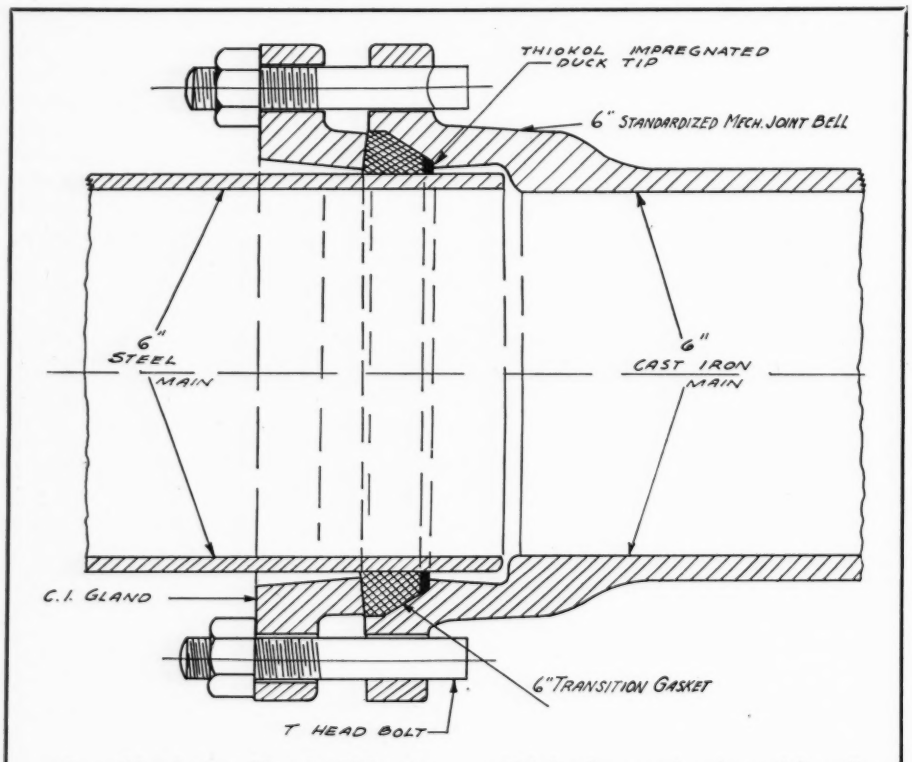
The engineering calculation of the size of a gas main is only one step in the selection of the proper size. The next step is to apply financial engineering to determine whether a certain calculated commercial size cast iron gas main or the next size larger should be laid to supply an increasing load or growing territory. It is imperative that the carrying charges of the two alternatives be compared on the basis of the present worth of the future annual charges as outlined in this study.

It has been the purpose of this discussion to outline a method or approach to the dollar economics of gas main sizing. The values assumed are considered reasonable, and based on these assumed values, it can be concluded that:

If it can be foreseen that the capacity of the calculated commercial size main will be reached any time prior to about 20 years for those mains listed on *Fig. 1*, about 12 years for those on *Fig 2*, and about 28 years for those on *Fig. 3*, and hence will require the installation of a second duplicate main, then the next larger size main should be laid in the first place. In other words, the larger main need only be up to 50% capacity any time prior to about 20 years to justify its installation for those mains listed on *Fig. 1*, and only 33% capacity any time prior to about 12 and 28 years for those mains listed on *Figs. 2* and *3*, respectively.

Decisions based on first cost only may ultimately cost the gas utility company considerable sums of money.

This paper was presented at the annual AGA convention in St. Louis, Oct. 15-17.

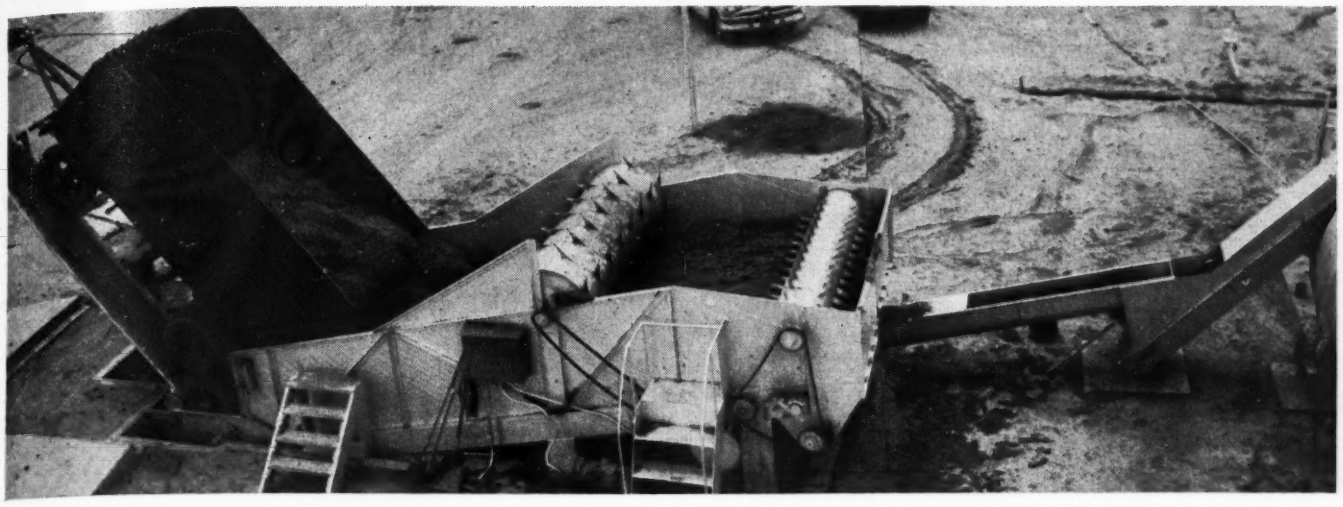


Consolidated Gas Electric Light & Power Co. of Baltimore has discarded expensive, space-consuming reducing sleeves for connecting steel pipe to mechanical joint cast iron pipe and is using instead a special rubber transition gasket suggested by J. Kemp Neal of the main and service department.

Mr. Neal's idea was relayed to U. S. Pipe & Foundry Co., Burlington, N. J., who subsequently developed a gasket which has been performing satisfactorily at much lower cost. The company now manufactures them for 3- to 12-in. nominal pipe sizes.

The new gasket is similar to a standard coupling gasket except that it is made thicker to fill the space between the outside diameter of the steel pipe and the inside diameter of the bell of the cast iron pipe.

For his idea, Mr. Neal won $350.



Chopped alfalfa is dumped from the field trailer (at left, above) into self-feeder bins. The long trough leads to a dryer (photo at right) which is a revolving drum heated by natural gas.

Using Off-Peak Gas for Dehydration of Alfalfa

FROM May through October, Colorado Interstate Gas Co., Colorado Springs, supplements its gas load by supplying natural to fuel a number of alfalfa dehydration plants in Colorado's Arkansas valley.

A pioneer in making alfalfa meal is the W. J. Small Co. whose plant at Deerfield, Kan. (15 miles northeast of Lakin compressor station) is served natural from the lines of Colorado Interstate. The plant, one of Small's 53 in six states, uses 1 MMcf per day to power a special burner designed by the firm and manufactured by a local foundry at Neodosha, Kan.

The company contracts for enough alfalfa to keep the plant in continuous operation during the growing season. Harvesting is done with a machine developed by Small to mow, chop, and blow the hay into a trailer. A fleet of trucks shuttles back and forth taking empty trailers to the field.

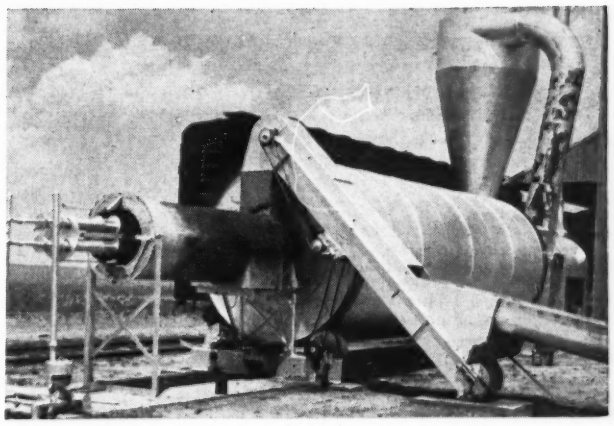
At the dehydration plant, a full trailer load of chopped alfalfa is run on a hydraulic hoist and dumped into the self-feeding machine. It is then delivered in an even flow to the dryer, a revolving drum which is heated to a thermostatically controlled temperature of 270° F. The dryer receives raw field alfalfa at one end and blows it out, dehydrated and ready for grinding, at the other end.

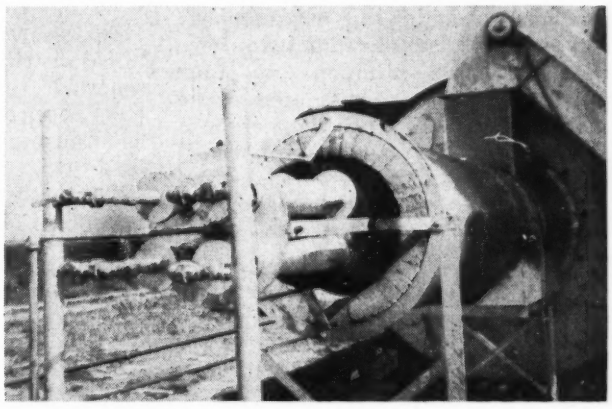
The burner proper is made up of several individual burners, each having a 7/16-in. orifice. Gas pressure at the burner is 12 lbs, supplied through a 2-in. Powers regulator with about 50 psi on the inlet side. The regulator at the burner is controlled by a pilot regulator which, in turn, is controlled by a thermocouple installed at the outlet of the dryer drum. The force used to actuate the regulator at the burner is reduced gas pressure supplied by the pilot regulator.

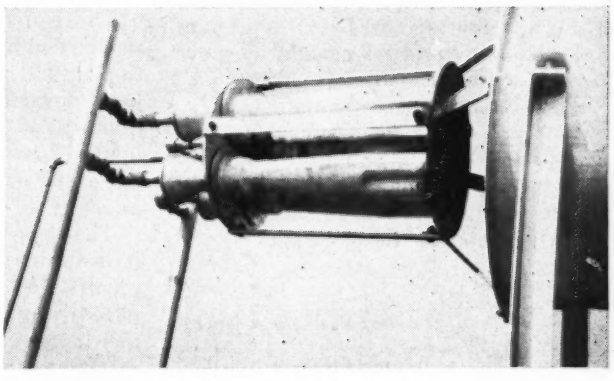
Large pipes and separators carry the alfalfa to a mill house where it is ground, cooled, and sacked. From field to boxcar, dehydration takes only about two hours. Last year the Deerfield plant processed 5300 tons of alfalfa.

It takes about 350 lbs of raw hay to make a 100-lb sack of meal. The Deerfield plant needs some 40 acres of alfalfa for a 24-hr run during which 1000 100-lb bags of meal are turned out.

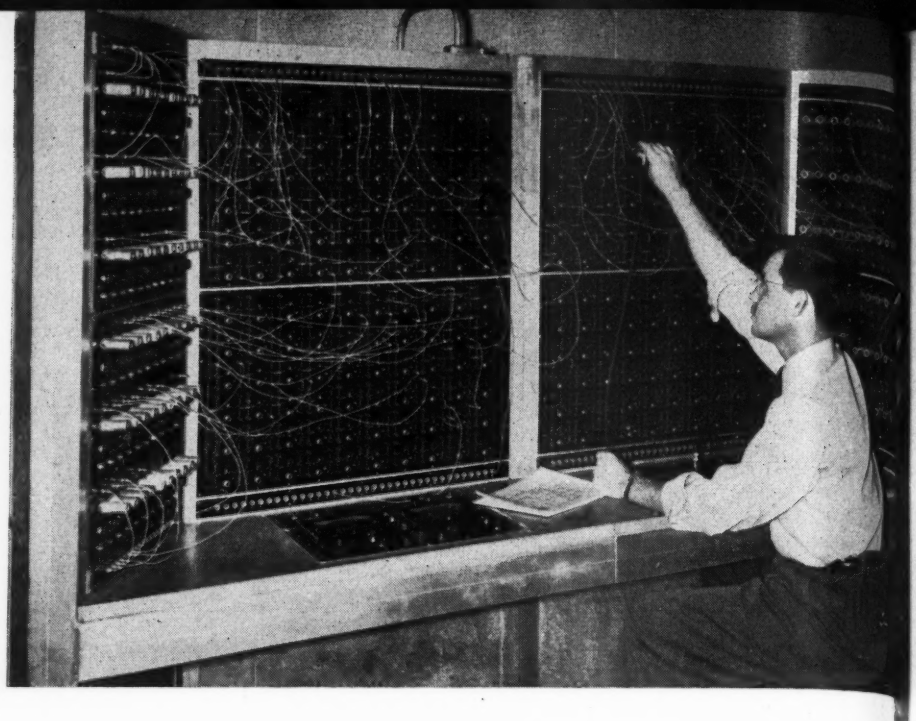
Adapted, with permission, from *The Gasser*, employee publication of Colorado Interstate and Canadian River Gas Co.'s.







Above are two closeups of the specially designed burner which heats the revolving drum. The Deerfield plant uses 1MMcf of natural gas per day.



B. E. Hunt operates the IGT distribution system calculator. Center panels contain the variable resistors; side panels house the load devices. The metering sections are in the table.

Distribution System Calculator

Gas institute develops new facility for accurate design analysis

A DISTRIBUTION system calculator which in the space of a few hours performs calculations of flow patterns and pressures, eliminating days or weeks of study required to obtain similar data by other means, has been developed and placed in operation at the Institute of Gas Technology in Chicago.

The various problems of every utility company gas distribution engineer have this in common: the requirement of providing satisfactory service by the most economical means. His chief problems are:

1. Checking the character of the flow pattern in the present mains and the adequacy of the system of mains to meet its load requirements.
2. Modification of the existing distribution system to meet increased loads.
3. The design of optimum or ideal layouts of mains to be used as guides in the development of new areas.

Simplified Solutions

The volumes of gas flowing through a given section of a distribution system are seldom measured; they are usually calculated from pressure measurements in governor pits and computed service requirements based upon customer appliance demands (with appropriate diversity factors). When the section of pipe is operating as a part of a grid system—with interconnected mains and the multitude of services commonly associated with grid systems—evaluation, by the usual methods, of a particular section's operation is virtually impossible.

The complexity of the study is compounded if a complete survey of a system is attempted, for that requires pressure and flow rate measurements at every governor pit, main junction, and service in the system. After these data are obtained, infinite calculations are necessary for their interpretation.

With the objective of simplifying distribution system calculations, the institute in 1950 began a study of the possible use of a calculator which would utilize similarities between the flow of electricity and the flow of gas:

Electricity		*Gas*
Voltage at source	=	Pressure at source
Voltage difference due to resistance	=	Pressure drop due to friction
Current through resistor	=	Flow rate of gas through pipe
Current consumed by load device	=	Volume of gas taken by consumer

No electric calculator entirely suited to gas distribution studies had yet been reported. In January, 1951 development of such a calculator was initiated as an institute project with B. E. Hunt as project supervisor.

Except that certain electronic components of the calculator require a 110-volt a-c power supply, the instrument is operated on direct current; its wattage requirements are low, and an ordinary radio "B" battery provides the current used in the circuits employed in calculation.

Design and Construction

The instrument has resistance components sufficient to permit the simulation of 240 sections of pipe. It has 120 load devices to represent up to that number of services or concentrated loads. There are enough positive terminals to allow calculations based upon as many as 48 points of supply.

The panels are so constructed that if it is desired to study the effects of a pipeline failure, the network can be connected directly to the negative side of the battery. Two sets of meters and meter circuits are provided, and halves of the panel can be separately used in the simultaneous study of two problems. Provision has been made for the connecting of additional resistor and load panels to increase the capacity of the calculator for studies of larger systems.

How It Operates

To set up a problem, a map of the distribution system is required. On it, all pipeline diameters and lengths must be marked, and gas requirements in Mcf per hour indicated at the points of demand throughout the system.

The operator of the calculator then marks the map to identify each pipe section and load of the system with a resistor and load device of the instrument. A figurative model of the system is set up on the calculator by connecting the resistors and load devices in the proper sequence.

The electric current is introduced at the point(s) on the instrument corresponding to the source(s) on the system.

Each resistor is then adjusted to a value corresponding to the resistance to flow in a pipe of the length and diameter specified. The load devices are adjusted to consume current proportional to the gas demand at the positions shown.

The current at the source(s) is set proportional to the gas flow at the source(s). When the gas flow is unknown but the pressure is known, the voltage is adjusted proportional to the pressure.

Subsequent adjustments of the resistors are made until the network is electrically "balanced." The current through each resistor is measured, yielding a figure for the gas flow in that pipe section. The voltage is then measured to establish a figure for the pressure at that point.

The meter readings are readily converted to gas flow rates and pressures.

Many Applications

The rapid increase in urban population and expanded usage of gas for space heating have placed unprecedented demands on existing distribution systems. Many companies have been unwilling to assume this increased load, because of possibly inadequate distribution system capacities. Some of these systems may be adequate; the institute's calculator can aid in evaluation of their capabilities.

Use of the calculator in extending existing systems is illustrated in the accompanying drawings and table. In the problem stated there, the solution indicates that modification of the system is necessary. In practice, the problem would be carried into this second phase: the distribution engineer of the utility company would indicate possible locations of new feeder mains or regulators, and by use of the calculator could explore all design possibilities to determine which alternative would be most efficient.

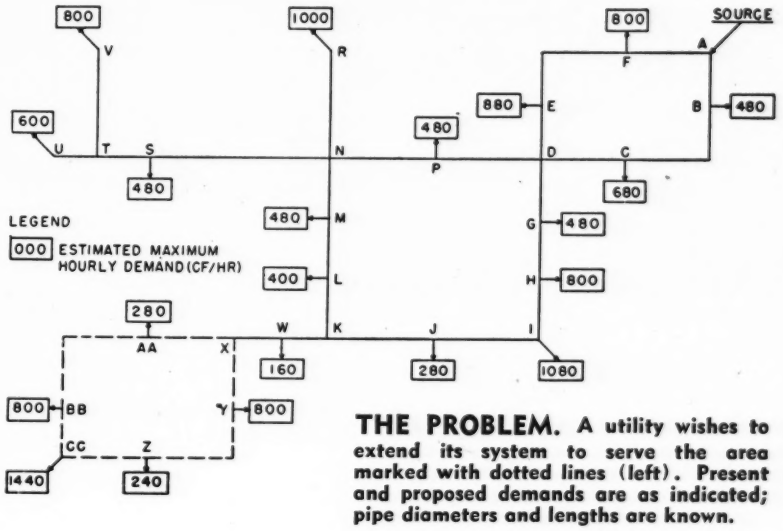
The calculator is especially time-saving in these additional analyses. Many locations can be tested in succession without the fatiguing calculations which normally accompany such a task. The calculator also determines the best solution, instead of accepting the first selected at random which meets the problem's requirements.

In planning a new distribution system, an engineer can avoid months of calculation by merely submitting a map of the proposed system, with anticipated demands marked on it. The problem can be set up on the calculator, and by rapid trial-and-error methods the optimum layout will be determined, including pipe sizes and regulator locations.

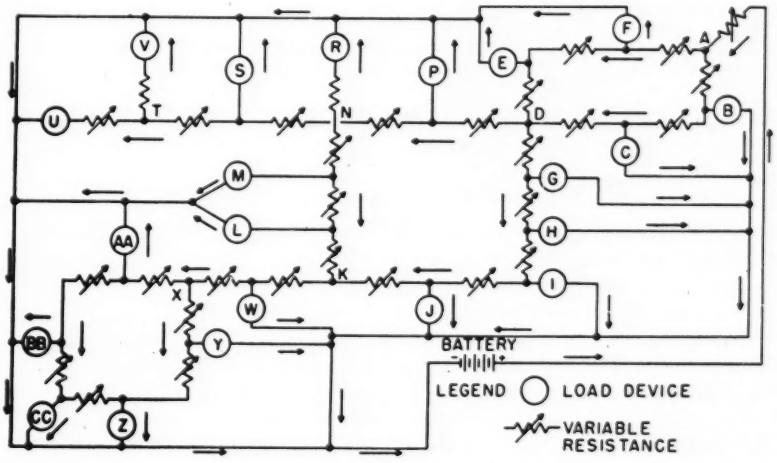
Available To All Utilities

The calculator is of inestimable value to gas utilities faced with distribution design problems. The institute's instrument is available to all members of the gas industry, regardless of whether they are institute members, at a nominal charge to cover the cost of the instrument and the operating engineer's time. The Institute of Gas Technology, which is the gas industry's own educational and research facility, will welcome inquiries on distribution system studies.

SOLVING A TYPICAL PROBLEM



THE PROBLEM. **A utility wishes to extend its system to serve the area marked with dotted lines (left). Present and proposed demands are as indicated; pipe diameters and lengths are known.**



SOLVING THE PROBLEM

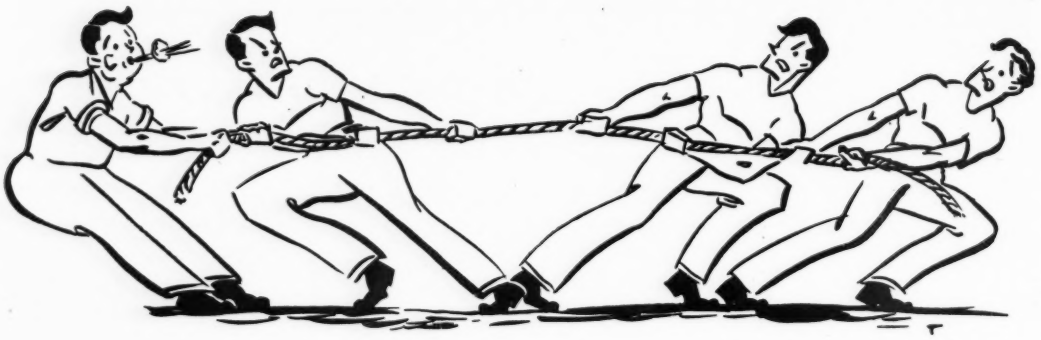
A figurative model of the system and its proposed extension is set up on the calculator. Load devices are adjusted to consume current proportional to the gas demand at the positions indicated by letters. Each resistor is set to a value corresponding to the resistance to flow in the pipe sections.

RESULTS OF ANALYSIS

The table at the right presents the results of the analysis illustrated in the drawings above. Since too high a pressure at source would be necessary to maintain a required minimum pressure of 5 in. (measured in inches of water) throughout the system, an additional source of gas must be provided. The calculator can determine the best location for the new source or can test all available locations.

Mains Section	Flow (cfh)	Pressure* Drop	Point	Pressure*
A-B	7625	3.31	A	14.02
B-C	7160	2.96	B	10.71
C-D	6480	0.04	C	7.75
A-F	5925	3.31	D	7.71
F-E	5125	2.74	E	7.97
E-D	4225	0.26	F	10.71
D-G	3830	1.04	G	6.67
G-H	3340	0.99	H	5.68
H-I	2525	0.13	I	5.55
I-J	1465	0.08	J	5.47
J-K	1175	0.00**	K	5.47
D-P	6940	0.00**	L	5.68
P-N	6480	0.04	M	6.67
N-M	3425	1.00	N	7.67
M-L	2970	0.99	P	7.71
L-K	2540	0.21	W	5.38
K-W	3730	0.09	X	5.22
W-X	3575	0.16	Y	5.22
X-Y	1855	0.00**	Z	5.08
Y-Z	1025	0.14	AA	5.08
Z-CC	800	0.03	BB	5.05
X-AA	1755	0.14	CC	5.05
AA-BB	1485	0.03		
BB-CC	680	0.00**		

*Pressure measured in inches of water.
**Pressure drop is less than 0.01.



Who's Winning the Tug-of-War for The Commercial Load?

By LEON OURUSOFF Washington (D.C.) Gas Light Co.

ALTHOUGH this paper is in the nature of a progress report, perhaps the word "progress" is not quite the proper one. We all realize that we are in a very serious competitive position, of course, and we have known it for several years.

The industry has been alerted to this fact repeatedly. Not only alerted, but given perfectly clear-cut recommendations on the action necessary to be taken. Utility men, including our highest executives, have heard the story and have been offered blueprints for action. You will recall the American Gas Assn. general session addresses by Everett J. Boothby and Frank H. Trembly in 1948 and 1949, the recent speech by Fred Kaiser before the executive sales conference in Chattanooga, the annual reports of AGA's managing committee and of the food service equipment committee, and the many articles on this subject which have been published in recent years.

Just how much attention has been paid to these admonitions? Just where do we stand today, compared, say to a year ago — October 1950?

To obtain answers to these questions, reports were secured from 30 gas companies representing a little more than 11 million gas customers located in every region of the United States and from officials of our most prominent manufacturers of commercial ranges, ovens, fryers, broilers, counter appliances, and controls.

What these people have to say is what you will now hear — a compilation of facts and opinions to which many of you have contributed; it amounts to a composite picture of the competitive situation of the gas commercial cooking business in the year 1951. Let us review it.

1. *Is your present competitive position in commercial kitchens stronger, unchanged, or weaker than last year?*

Gas companies gave these answers:

44% feel present position *stronger.*
46% feel present position *unchanged.*
10% feel present position *weaker.*

And the manufacturers said:

Gas commercial cooking equipment of the heavy duty type is not only holding its own but has gained in its position *except in neglected territories.*

The 44% of gas companies whose position is reported stronger attribute their improvement to the following factors:

- Effectively combating electric meat shrinkage claims.
- Concentrating on displacing electric cooking equipment.
- Persisting in changing new job specifications from electric to gas by full presentation of facts and systematic contact of architects, engineers, dietitians, and dealers.
- Periodic inspection of gas equipment and improved program of servicing and repairs.
- Better publicity and advertising.
- More tools available such as testimonials, mailing pieces, Alfonso's story and "Mr. Flameless and Mrs. Flame" presentation.
- Improved dealer confidence through new dealer policy and better relationship.
- Increased gas company sales personnel and coverage.
- New aggressive sales campaign in cooperation with dealers.
- Survey of every eating establishment in city.
- Better understanding of economics by customers.
- Good publicity caused by swing to natural gas.
- Progress in high temperature hot water applications helping to hold and gain cooking loads.
- Improvement in recent gas fryers.

The 46% of gas companies whose position is reported unchanged and the 10% reporting "weaker" attribute their plight to these factors:

- Cumulative effect of all-out electric promotional activity creates impression that electricity is more progressive and modern.
- Increasingly intense sales campaign by the leading manufacturers of electric equipment sometimes coupled with unfair claims and tactics.
- Misleading electric advertising.
- Improved electric appliances.
- Insufficient training of gas company personnel.
- Insufficient variety of gas appliances vs. electric appliances.
- Local temporary gas shortages impeding promotion.
- Important dealer distributors electrically minded.

These figures and statements lead to a perfectly clear conclusion: The 44% whose position is stronger than last year are the ones who have responded to the alert, who have found new ways, better ways of meeting the challenge.

The 56% whose position is unchanged or weaker than last year are those who are satisfied with carrying on as usual and who blame everything on "that terrible competition."

We must be grateful to the first group for demonstrating that the commercial cooking load is ours if we strive for it.

2. *Have you taken from competition more than you have lost of substantial existing cooking loads in the past year?*

To this:

54% of the gas companies reported they took more than they lost.
32% of the gas companies reported an even break.
14% of the gas companies reported they lost more than they took.

Here again companies which made a good showing credit their success to stronger promotion, particularly specific campaigns and persistent and friendly calls on electric users.

Those who made a poor showing blame competition, electric-mindedness of architects and dietitians, and the plain fact that it is easier to protect 10 jobs than 90 jobs (this being the assumed rough ratio of electric to gas saturation).

Here are a few examples of jobs in which gas has recently replaced electricity:

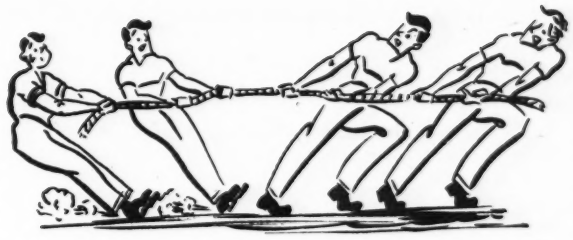
Porter's Diner — Boston
Mammy's Restaurant — St. Louis
Methodist Publishing House — Nashville
Mountain Brook School — Birmingham
Sears-Roebuck — Philadelphia
Fisher's Restaurant — Philadelphia
Philadelphia Naval Hospital — Philadelphia
Trinity College (ranges) — Washington
Federal Bake Shop — Washington
5 Mighty Midge Kitchens — Washington
S & W Cafeteria (ovens) — Washington

3. *Is competition keener in newly opened establishments or in existing eating places?*

88% of gas companies said new places present stronger competition.
12% of gas companies said existing places present stronger competition.

The majority of gas companies and the manufacturers agree that at the present time our most vulnerable position in the heavy duty equipment field is in newly built establishments, particularly hospitals, schools, and other institutions, for these reasons:

- The electric companies and the electric manufacturers are always in on the ground floor, at the initial planning stage of every job.
- Newcomers to the restaurant business who have not learned the hard way are impressed with the electric story so forcefully conveyed to them by the electric industry.
- Architects, consulting engineers, and dietitians are among the principal targets of competition. They are effectively deluged with publicity, advertising, training, and continual contacts by competitive salesmen; and claims of electric modernity, cleanliness, safety, coolness, aand automaticity. Architects, engineers, and dietitians don't pay the fuel bill, and the high initial cost of electric cooking equipment is frequently buried in the total contract price of the building.
- The kitchen equipment dealer often goes along for the ride where electric equipment has been specified. Why should *he* wage the battle? What has *he* to lose? He helps those who help themselves.
- Gas equipment manufacturers have stated that they are unable to provide adequate coverage of builders, architects, engineers, and dietitians and that such coverage must be provided by gas utilities at the local level. When this is absent, jobs go electric.
- The electric fellow seems to be spending more, planning better, and working harder than many of us in the gas industry.



Accordingly, it can be said that our competitive situation in hospitals, schools, other institutions and new buildings such as apartment hotels, represents a threat to our entire commercial cooking load since a competitive foothold in new, modern institutions has tremendous publicity value which can start snowballing in all other fields of commercial cooking.

Again I repeat, fortunately for our industry, many gas utilities are fully equal to this challenge. This could be illustrated by a long list of important jobs — mostly new establishments, including many institutions throughout the United States — where commercial gas kitchens have been recently specified or installed, in many cases reversing original electric specifications. And by a much shorter list, obtained from the same sources, containing the names of jobs which went electric. It is interesting to compare the two lists. The comparison shows that the numbers of gas and electric installations are in the approximate ratio of 84-to-16.

I rather doubt, however, whether this ratio 84-to-16 should be taken as a true index of our competitive situation, nationwide, in the new construction field. We better accept it as indicative of the situation in areas served by the more progressive gas companies which furnished most of this information.

4. *Is your present counter appliance load in a stronger, unchanged, or weaker competitive position than last year?*

Only 7% of gas companies answered that their position is stronger.
48% reported their position unchanged.
45% said their position is weaker.

The minority whose position is reported stronger give full credit for their relatively favorable condition to the recent improvement in the design and appearance of gas counter equipment, notably due to the progressiveness of one prominent manufacturer in that field.

One company states: "Although electric gains in counter equipment are numerous, the relative position of gas is much improved over one and two years ago due to im-

proved gas fryers and better gas counter equipment offered in the past year."

The majority whose position has weakened blame many factors, namely:

- Convenience, economy, cleaning accessibility of plug-in appliances in contrast with solid connections and piping.
- Eye appeal and completeness of matched competitive line.
- Lower price of competitive counter appliances.
- Strong competitive advertising.
- Too much smoking and fat usage in certain models of gas counter fryers.
- Gas counter broilers need improvement.
- The coffee maker is in a very vulnerable competitive position.
- Sales of gas toasters are declining.
- Manufacturers of gas counter equipment don't offer anything parallel to competition in way of a promotional program and should do so.

Gas equipment manufacturers have these comments to offer:

- The small restaurants such as the diners, little cafeterias, bars, drug counters, etc., which are multiplying on the periphery of our growing cities are falling prey to competition. The small restaurant owner is particularly vulnerable to the electric story because of his extensive use of counter equipment, because he does not inform himself through publications and restaurant association activities and because, therefore, he lends an attentive ear to the electric story reaching him via the persistent contacts of electric salesmen. The electric industry concentrates its efforts in this field. Gas utility men neglect it. They are outnumbered by their competitors and seem too indifferent to the small owner.

In conclusion, it appears that the general situation in the counter field should be improved by:

1. More nearly equalling competitive promotion.
2. Finding ways of lowering cost of gas units.
3. Improving completeness of line and eye appeal.
4. Developing better means of connecting and disconnecting units.
   (The latest report on the gas connector is that several hundred units will shortly be made available by a manufacturer for field installation and test.)

5. *Which among the major four appliances are more vulnerable to competition?*

89% of gas companies agree that fryers are most vulnerable and 73% of gas companies agree that ovens are next.
The consensus indicates that ranges and broilers are about equally vulnerable but much less so than fryers and ovens.

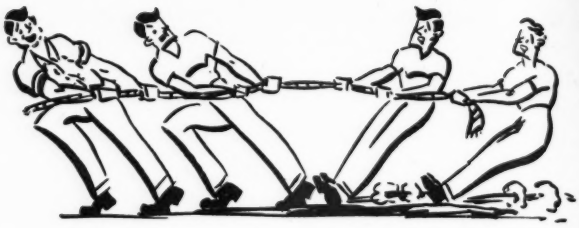
And here are comments from the gas industry on this subject:

On the favorable side:

- Many operators have returned this year to gas fryers after a fair trial of the best electricity had to offer.
- We are gradually getting the fryer load back by installing gas fryers on a trial basis when replacing electric units.
- The AGA is to be complimented on the excellent work it did in fundamental research on gas fryers. We are impressed with the results, and it is our intention to apply them to further development of our deep fat fryer.
- The gas industry is indebted to the food service equipment committee, the equipment improvement committee, the committee on comparative services, the AGA utilization engineer and AGA Laboratory, for the contribution of each of them, through studies, tests, and publication of results, to the now available factual knowledge on the tremendous economic advantage of gas over electric equipment for commercial cooking.

On the less favorable side:

- The gas industry needs immediate adaptation of automatic protective ignition devices to heavy duty equipment. Safety of operation is first in the mind of institution, hospital, and school management.
- Our manufacturers, together with GAMA and AGA, *must* get together on more standardized design to reduce time-consuming and costly repairs, endless delays, and bulky catalog files. Competition is ahead of us in this.
- In recent months we have received complaints about new equipment, one line particularly, having to do with structural weakness and imperfections of design. There is a limit beyond which added production economies boomerang. To reduce manufacturing cost is a sound objective if "value" of the product is not lost. I appeal to our manufacturers not to let gas equipment quality slip where it will be considered a lesser value for the dollar or a "grade" inferior to competitive equipment. This must not and will not happen.
- AGA should continue research on gas coffee makers and on the application of power burners to heavy duty commercial appliances.
- Gas utilities should unite in a drive to prevail upon manufacturers to accept more recommendations of the equipment improvement committee in the interest of better appliances.
- The oven and fryer are our Achilles' heel in the heavy duty field and a foothold whereby our commercial cooking load could be lost. Improvement here is essential.
- Unfortunately, equipment entirely inadequate for the job is sometimes sold or specified. We know of installations where restaurant ranges are specified in places where the restaurant load very clearly indicates the heaviest duty equipment. Result: dissatisfaction with equipment and fuel.
- Our industry is badly in need of a "double-decker" gas broiler unit (one unit stacked upon the other) to meet competition.



6. *Please describe any recent changes in your policies or methods of operation that may have affected your competitive postion.*

Of the reporting gas companies:

52% indicated improved policies or methods of operation.
48% indicated no change.

Those who have stepped up the quality of their methods (and those are the ones who report to be stronger competitively this year) have each made one or more of the following improvements:

- Augmented sales coverage of small restaurants.
- Added commercial cooking specialist to their staff.
- Added a kitchen design specialist to their staff.
- Initiated a bonus compensation plan for electric replacements.
- Adopted a more vigorous service policy.
- Established a training program for commercial servicemen.
- Launched a fryer replacement campaign.
- Improved dealer contact program.
- Increased the number of scheduled service calls.
- Increased coverage of architects, engineers, and dealers.
- Increased direct mail promotion and advertising.
- Attained closer relations with restaurant association.

7. *Here are some opinions on the competitive situation as expressed by leading restaurateurs, active in restaurant association work, in 14 different regions:*

- Trend continues to gas in our restaurants.
- Cost, speed, and service are the basis for continued preference for gas.
- Position of gas this year has taken a turn for the better after having slipped in recent years.
- The trend continues to selection of gas equipment.
- Such demonstrations as "Mr. Flameless and Mrs. Flame" contribute to the improved competitive position of gas.
- Certain types of new gas equipment lack smoothness of finish and do not stand up well enough.
- Gas position is improving due to better, more understandable advertising and to new public interest in natural gas.
- Speed advantage of gas is impressive and gas company service is improved but not yet sufficient.
- The competitive trend is unchanged except that gas ovens are at some disadvantage in low temperature roasting which is growing in popularity.

- The restaurateurs' first concern is safety; second, performance; third, ease of cleaning and servicing; fourth, operating cost.
- Gas equipment has greatly improved in recent years but room for further improvement exists.
- Electric restaurants often return to gas.
- Gas position has improved with respect to fryers and counter equipment, but not ovens and coffee makers.
- Position of gas is better and is helped by the increased popularity of the fuel due to its diversified satisfactory uses such as heating.

8. *How can we most effectively improve our competitive position in the commercial cooking field?*

Replies indicate that there are three actions of first importance (all about equally important) on which we must concentrate without delay:

Strengthen dealer relations.
Improve appliance servicing.
Accelerate product development.

Next in importance (also all about equally):

Improve utility personnel training.
Strengthen gas company sales organization.
Increase advertising and publicity.

The following comments received from the industry complement these suggestions:

- Properly serviced gas equipment never loses efficiency in contrast with competitive equipment.
- Nobody ever lost a satisfied customer and few can keep one who is dissatisfied with neglected equipment.
- Proper equipment installation is the No. 1 problem getting the least attention.
- Certainly service is a utility obligation and responsibility until the type of our fuel and conditions of supply become absolutely uniform and constant.
- Everyone realizes the paramount importance of good public relations to a utility, but not all understand that proper servicing and adequate contacts of small and big customers alike represent the essence of good public relations.
- Servicemen must be trained to become sales-minded instead of aloof.
- Dealers have no part in servicing and yet many utilities are letting their service disintegrate.
- Most gas companies claim they have a commercial kitchen service program. We, manufacturers, know that several of them do have a service department, but are not organized to render adequate service in eating establishments.
- More and more restaurateurs, hotel men, and institution executives are willing to pay a premium for better equipment. When gas equipment falls short of their exacting requirements they invariably lend a most attentive ear to the glamorous story of competition.
- Not that our appliances, our promotion, our advertising are weak — they are not — but we are not nearly keeping up with the tempo of competition and we must do so.
- Our publicity effort on the national scale is altogether insufficient; AGA should explore new channels and double its efforts.
- Our manpower and funds for selling and promoting commercial gas cooking are utterly unequal to the tremendous expansion of the food service industry, the greater complexity of modern selling, and the mounting sales effectiveness of competition.
- The gas industry must follow the example of competition in stimulating educational programs in schools and universities where food service executives, architects, dietitians, and many others absorb the competitive story.
- Certainly a segment of the gas business as large and as profitable as commercial cooking should be entitled to a fully staffed, well trained hotel and restaurant department, rather than to incidental or part time coverage of the field as is too often the case.

National Advertising

The analysis just presented may gain in perspective if we show some facts to illustrate our competitive position in one of the principal components of the sales effort—advertising.

The following tabulation shows estimated advertising dollars and pages, gas and competitive, in comparable periods of 1950 and 1951:

Advertising Expenditures	Gas	Electricity	Total
1950	55%	45%	100%
1951	57	43	100
Advertising Pages			
1950	58%	42%	100%
1951	49	51	100

You can see that we are not doing too badly, but please observe that competition's advertising program is almost equal to ours, although our share of the commercial cooking business is at least *five times* greater than theirs.

I can assure you, however, that the 1952 program of commercial gas advertising recently submitted to top levels of AGA for their approval has been stepped up both in quality and amount of coverage to an extent that should improve our position very perceptibly. You will hear about this in the near future.

Conclusion

Some parts of this report are encouraging, some are alarming. What considerably perturbs your reporter is that — whatever our plights — they are principally caused by the negligence and apathy of a very considerable portion of the gas utility industry. This can be illustrated very clearly by recent replies which AGA received to 460 copies of a questionnaire sent out to member gas companies.

These answers revealed that only 32 companies actively cooperate with local restaurant associations, 38 hold meetings with dealers, 35 have full-time commercial sales personnel, and 38 are interested in promotional demonstrations.

It looks from this as if only about 8% of the questionnaire recipients can admit participation in anything like a real promotional program. These 8% are the companies who carry on their shoulders almost the entire promotional load. They are the ones who can justly report an improved competitive situation in their territories, this year compared to last. The other companies are failing and their failure affects the position of our entire industry. Look at this tabulation showing commercial cooking equipment sales, gas and competitive, in recent years and focus your attention on 1951.

All Kitchen Appliances (Dollar Sales)	Gas	Electric	Total
1949	84%	16%	100%
1950	81	19	100
1951*	74	26	100
Only Kitchen Fryers (Unit Sales)			
1949	81%	19%	100%
1950	76	24	100
1951*	71	29	100

*Estimated

You will then realize what disservice is done to our industry by those who are neglecting the sales effort. Their indifference is reflected in substantial sales gains by competition, nationwide, as these figures show.

I urge broader support by the whole gas industry of what only a handful are now doing. I repeat Mr. Boothby's 1948 warning that our industry must make long range aggressive plans in addition to whatever defensive action is needed immediately.

This article is adapted from a paper presented before the meeting of the industrial and commercial gas sections at the AGA convention in St. Louis Oct. 15-17.

PAD's Gas Branch

- *How it can integrate the gas industry*
- *How its divisions operate*
- *How it allocates materials*
- *How it evaluates the steel outlook*

By C. P. RATHER
Assistant Deputy Administrator
Petroleum Administration For Defense

LET'S take a look at the beginning of the gas branch in PAD. After the Defense Production Act was passed and while the defense structure was being built, the American Gas Assn. very properly felt that the gas industry was sufficiently important in the defense economy to be classified as a defense supporting industry and, as such, to be fitted into the defense structure in the same way as petroleum, electric power, solid fuels, and others.

In the debate that followed, it was readily admitted that gas was a defense supporting industry. The question was whether it should be a separate agency or a part of PAD, which was already in existence.

I personally did not participate in those discussions but if I had, I suspect I would have been strong in my support of having an independent agency. That certainly would have been the normal position to take. Based on my experience to date, I think I would have been wrong for two reasons.

Part of Oil Industry

First, in the broad sense of the word, the gas industry is becoming more and more a part of the oil industry. About 60% of all gas consumers use straight natural gas. A majority of those who do not use natural gas use gas derived in part from natural gas, oil propane or butane, all of which are petroleum products. The gas industry leans heavily on the oil industry for its supplies and the oil industry surely must value the gas industry as one of its most important consumers and means of marketing its products.

Second, together, both groups are strengthened in presenting their claims for materials—and they use the same kind, particularly line pipe. Far better a united front than a divided one.

I don't mean to say that there is no competition within PAD for materials. There is. But when men of integrity, thinking in terms of the national interest and the defense effort, look objectively at the projects before them, I have found the answer arrived at is sound and defensible. The resulting program presented to the Defense Production Administration can be supported and argued vigorously without getting DPA confused by bickering between two claimants for the same thing. Most important of all, the National Production Authority can then proceed to implement the program and schedule the production to get the maximum results.

THE AUTHOR (right) chats with C. E. Bennett of Pittsburgh, AGA vice president, between sessions at the AGA convention in St. Louis.

I think the decision to treat the gas industry as a part of the oil industry and incorporate it in PAD as an autonomous branch on an equal footing with oil was a wise one. So far it has worked well, but keep in mind, it is men who make it work. And here I want to compliment Bruce Brown, who is deputy administrator, Al Frame, who is my opposite number in the domestic oil branch, and Strib Snodgrass, who has the same position in the foreign oil branch.

As you know, the gas branch was established late. It was a reluctant addition and had not handled itself too well in becoming a part of PAD. It would have been awfully easy for the old heads to have given it a cold shoulder, made it fight for everything it got, and generally taken it for a buggy ride in the mystic maze of Washington procedure.

This was not done and I will support that statement later. I think the reason it was not is because of the broad caliber of the men I have named and also others who were there and knew their way around.

Recently I read a paper at a meeting of the Independent Natural Gas Assn. of America. In it I urged that each element of the gas industry— producer, pipeliner, and distributor—give more consideration to the problems of the others, and within the limits of propriety demanded by the essential autonomy of each element, that all three act together to accomplish those purposes which are both for the good of the industry as a whole and the public it serves.

PAD can be the catalytic agent in this difficult formula. It can offer a meeting ground where solutions to broad industry and national problems are sought. When you have an opportunity to supplement its staff, send it your best men and when you feel called on to criticize, be sure of your grounds before you cut loose.

Three Divisions

The gas branch of PAD is organized into three divisions — facilities, operating, and planning—each headed by a director. I will take them one at a time, outline their functions, tell you something of what they have done, what their problems are and how you can help them in order to help yourselves do the job before you.

First, the facilities division, which has to do with materials. It must determine the immediate material requirements of the industry, take the preliminary steps to obtain allotments of those

Presented at the AGA convention in St. Louis, Oct. 15-17.

materials, check to see that they are manufactured, analyze the PAD-26 forms to see that materials are not wastefully used, make the initial recommendation as to whether a project is to be approved or deferred depending on its essentiality in the defense effort and to the civilian economy, schedule the materials to the particular project, and keep books to see that no more steel or other controlled material has been allocated to the industry than was allotted to PAD by the DPA.

This division makes only the initial recommendation as to how a project shall be treated. I would like to stress that. Application of the criteria to determine the essentiality of one project over another is too important a matter to rest on a single man or even a single group. A careful system of committees has been set up, which includes people from other divsions, to review the recommendations of the facilities division before final action is taken.

1020 Applications

This division has a big job. Since use of the PAD-26 form was begun early in June 1951, it has processed 1020 applications. Of those, 60 have been amended by the operators, and that of course necessitated further review. Out of the 1020 cases, 38 were amended at the request of PAD. Thirty-three cases have been postponed and 75 are presently pending review and committee consideration.[1]

The total steel pipe authorized to the industry for construction, maintenance, repair, and operation in the projects which were authorized was 1,722,580 tons.

During the third quarter of 1951, PAD received an allotment of steel for pipe from DPA in the amount of 768,800 tons. Of this amount, gas was allotted 517,000 tons, or 67%, and the remainder went to the various oil divisions, i.e., transportation, natural gas and natural gasoline, refining, marketing, and production.

During the fourth quarter of 1951 the total allotment of steel for pipe by DPA to PAD was 893,221 tons. Of this amount, gas was allotted 483,296 tons, or 54%; the remaining 46% went to the various oil divisions.

You will note, of course, that the tonnage figures on pipe for the third and fourth quarters allocated to gas total only 1,000,296 tons and that amount does not coincide with the figure of 1,722,580 tons previously given you as the total steel for pipe allocated to the gas industry by PAD up to Oct. 1, 1951. This is because the latter figure includes advanced allocations made into the first, second, and third quarters of 1952.

The allotment of steel for pipe which PAD is to receive from DPA for the first quarter of 1952 has not been finally determined. However, preliminary figures indicate that it may be less than the fourth quarter of 1951.

It also appears that its division between oil transportation and gas transportation and distribution within PAD may be less favorable to gas because there are several highly important oil lines which now have to be pushed since they had been deferred or slowed down while the gas lines were given the green light in order to try to complete them before this winter. This will affect the availability of large diameter pipe for gas in the first and second quarters of 1952.

It will interest you to know that all of the large diameter gas lines that have been authorized by the FPC, except one, are rated for enough pipe to complete them for the 1952-1953 winter, and one is rated which is not as yet authorized by the FPC.

It will interest you further to know that all the big transmission line projects that were underway in 1951 should be completed before the coming winter (with the exception of two important ones and lines supporting those) all of which supply gas to the Appalachian area.

I think you will agree from the above figures that the gas industry has not been mistreated within PAD. In fact, gas would appear to have been favored —and yet even that conclusion is untrue since the question of whether gas or oil received the material it required has not been a consideration. The single consideration has been the importance of the project in the defense effort.

The proportions may well be different in the future. Keep in mind also that the figures I've given you relate to steel for pipe. They do not cover plate, oil country tubular goods, and other shapes and forms of which the oil industry is a very large user. The proportions of *total steel* allocated to the respective industries within PAD would be entirely different from the proportions for pipe alone.

Operating Division

In order of listing, the second of the gas branch divisions is the operating division, which has to do with seeing to it that gas is obtained for those industries which are essential in the defense effort. This, as many of you know, can present some serious problems because in most instances there is not enough gas.

In most cases we have been able to meet this problem with reasonable success without dislocating other sales, by working out arrangements for the use of combination fuels. In other cases, we have had to take the position that nothing could be done or that the industry seeking help was less essential than some others that would be harmed if it were served.

So far we have not had the unhappy job of taking gas away from someone in order that some highly essential industry, which can only operate on gas, can be served. I must warn you, however, that such situations may arise and that, if they do, we must and will take such steps as are necessary to make the gas available. We will have no other alternative if we are to discharge our plain duty under the Defense Production Act.

No doubt you have visualized the possibility that you, as operators, may be called on to give up some of your gas supplies to another company. This could occur but it would be a last resort. First every effort would be made to obtain the gas from within the system on which the essential industry was located. Steps would be taken to see whether the necessary defense product could be manufactured by some similar industry on another gas system that was in a better position to supply the gas which was required. Everything would be explored to avoid setting up the chain reaction that might occur should we have to start taking gas from one system to supply some essential industry located on another.

Emergency Situations

Emergency deliveries of gas from one system to another in order to prevent a complete outage presents another thing entirely. That problem causes us far less concern than the former. The record of cooperation in the industry to meet these kinds of situations is so good that I suspect they would be solved in most instances without PAD's being called on, except possibly as a kind of clearing house.

There are, however, some intermediate emergency situations that may arise. For instance, suppose industry must be cut off to avoid the threat of a complete outage, yet some of that industry is so essential that it must be kept operating. Here is where PAD may have to ask for temporary help from one system to another even to the point of asking that some less essential industry on one system be curtailed in order to help other more essential industry on another system.

I know what some of you are thinking: Who pays for what and who holds the sack in these situations we have visualized? I frankly don't know. PAD has no authority over rates or charges for gas. It can only hope that, in the emergencies we are considering, the

[1] As of Oct. 15, 1951.

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parties involved will reach some quick agreement, and that the regulatory bodies having jurisdiction will recognize such agreements as emergency arrangements entered in to help the defense effort and not to break down normal regulation. I think the regulatory bodies will take that view if urged to do so by PAD, and of course PAD would expect to fully support any arrangements worked out at its request.

I sincerely urge that you consider these problems. Each of you knows whether they can occur on your own system and probably on your neighbor's. Get together now and see how you could combine forces to meet them. Make all the interconnections you can. Try to reach some general understanding on how payments could be made for gas or better still, how gas could be swapped back and forth. Do it yourself. Don't wait until an emergency is upon you and the governemnt must act.

In the event you think I have placed too much emphasis on service to the industrial user, don't forget that part of the obligation of PAD under the Defense Act is to maintain the essential civilian economy. This is very much in our minds. While it is difficult to expand general domestic gas service at this time because of the scarcity of steel, every effort will be made, within the limits of the steel and gas available, to meet those requirements and also to see that gas service is maintained and protected to those who are presently dependent on it.

Ivory Tower Section

I don't want to give the impression here that I think gas service is in a precarious position. That is not the case and I have confidence that the industry will maintain its sound position. But these are unusual times. The best of plans can be upset. Some calls may be made upon you that you do not expect. We *could* get into an all-out war. Be prudent. Sometimes it is wise to be pessimistic and prepare for the worst.

Now for the planning division. This is the ivory tower section, the home of the crystal ball gazers. Probably before this group gets through asking you questions, you will think it is the chief nuisance division of PAD and is set up solely to plague you.

Seriously, though, if PAD is to answer questions it is asked, if it is to be able to show the importance of gas in the defense effort and in essential civilian service and is to establish a long-term program which justifies its claims for materials, it must have a reasonably accurate long-term knowledge of where the industry is going, what the requirements for its product are, and how much critical material it will need to deliver those products.

This information can be obtained only from you. In order to obtain it, a consulting group of 12 men has been set up. The United States has been divided into 10 areas or regions and one man has been selected from each division because he lives in it and has special knowledge of it. One has been selected from the statistical department of AGA, and one has been selected who is chairman of the subcommittee on load forecasting for the AGA committee on economics.

These men have been qualified and formally appointed as consultants to PAD so that in performing their work they will be acting as government employees. They have had one meeting to date to try to design a questionnaire that will get the information we want and at the same time bother you as little as possible.

Steel Outlook

I cannot think of an industry that is more difficult to forecast than the gas industry. Any forecast must be based on more than one set of assumptions. You will be asked some questions you think you can't answer—but give it a try. When all the answers are completed we will at least have the best judgment of the industry. I hope the results will be beneficial to all of you in getting the materials and gas supplies you want, and also as a study of the industry.

I have covered as concisely as I could the gas branch of PAD—its operations and some of its problems. I will try to touch on two other subjects—the outlook for steel and the importance of the scrap drive.

As to the outlook for steel, the Oct. 5 issue of *U. S. News & World Report* had the following to say:

> Carbon steel requirements for the 1st quarter, 1952 are 156% of supply; structural shapes, 205%; plates, 180%; alloy steel, 160%; stainless steel 170% of available supply. Aluminum demand is 177% of supply, copper demand is even higher.

From what I hear I find no reason to question those figures and I call your particular attention to the 80% excess requirements for plate since, except for the seamless mills, it is plate from which pipe is made. And pipe, of course, is the principal steel product in which the gas industry is interested.

Since Korea the production of plate has increased but not at all in proportion to the increased requirements for it. The military alone takes a substantial proportion of the increase and so does the stepped up program for freight cars, ore boats, tankers, barges, the steel industry itself, and other industries. These more than absorb the increased production and cut heavily into a supply that was, even before Korea, none too much to care for the normal requirements of the gas industry.

These defense programs, particularly the military, are speeding up and industries that usually use large quantities of plate in one form or another are feeling the pinch. I expect the pinch on these large users of plate to be quite acute for some time, certainly until either the demand decreases or more plate is made. You can be certain the military and atomic energy needs are going to be met in full.

Making more plate means converting strip mills, and that means production of less consumer durable goods. This production, as you know, has already been drastically cut. Reduced to very simple terms as far as the gas industry is concerned the question is: Do we get more plate to make pipe to deliver gas and less strip to make gas appliances to burn gas or vice versa? Can the much-to-be-desired balance be maintained?

Another thing that is going to make the first quarter and probably the second and third quarters of 1952 difficult is the necessity of making up slippages that have taken place during and after the third quarter of 1951.

A recent order of the NPA requires that any operator who has a project extending over more than one quarter use his current quarter tickets in order to take delivery of pipe which has been authorized but was not delivered during the preceding quarter. The net effect of this order is to cancel some tickets that may be hard to reissue later.

Pipe Rating Order

Still another thing that may affect some operators is a pending order which will require the rating of pipe and other mill shapes and forms that may be made from conversion steel. Theoretically this should make more steel available to be rated but there is no telling to what industry this steel will be allotted by DPA, and in any event the order slams one door through which an operator, if he was desperate enough to pay the prices, could get "free" steel.

I can't be optimistic over the outlook of more steel for the industry. I think we will be very lucky to continue to have as much as we have had during the third and fourth quarters of 1951.

Finally, let me put in a plug for the steel scrap drive. It is entirely possible that steel production may fall as much as 1 million tons short of its goal for the first quarter of 1952 because of lack of scrap. This will vitally affect you. So when you go home, put cleaning up the yard first on your program.

Many New Househeating Jobs Seen For "Gas-Scarce" Areas Despite Lid

NOW that three months have passed since PAD issued its famous "slowdown" order on the use of gas for househeating, it appears that many thousands of homes in the "critical" gas supply areas are beginning to heat with gas for the first time and that many thousands will join them before another winter.

Exclusive

As Assistant Deputy Administrator C. P. Rather of PAD told the assembled state commissioners at the NARUC convention in Charleston, S. C., in late October, "the order was really a moderate one, a slowdown rather than a complete freeze."

"In fact," he declared, "the principal criticisms we've had are that it is too soft, especially where it permits additions of space heating customers during the first two years after the introduction of natural gas in a community."

How Deep a Cut

With seven states now having certified their willingness to undertake the control of househeating extensions and gas utilities having had time to size up the local situation, it is appropriate to ask: Exactly how deeply will the order cut into the anticipated growth of househeating loads on a nationwide basis?

Early in the year, AGA conducted a national survey[1] which indicated that 1 million customers would be taken on during the 1951-52 househeating season, with another 900,000 to be added for 1952-53. The total of 1.9 million for the two years represented an increase of a little more than 20% over the 9 million homes already using gas for househeating as of Jan 1, 1951.

During the past two months, *GAS* has sampled leading gas utilities in the 15 states (and the District of Columbia) which comprised the PAD critical list. By applying their revised figures against the figures which they provided for the AGA survey, it was possible to get an indication of the scope of the effect of PAD's order.

In the *GAS* survey, reports from utilities in nine states which accounted for 109,726 anticipated househeating additions for 1951-52 in the AGA survey showed that as of late October their expected new customers would total 80,605—a decrease of 29,121, or 26½%. For 1951-52, these same utilities, which had told AGA they planned to take on 95,530, now estimate their abilities at 66,974—a drop of 28,556, or just under 30%.

An extension of these percentages to cover the entire 15 states and the District of Columbia would yield these "guestimates":

For 1951-52 heating season, 283,455 househeating installations are being made, compared with the original year-ago estimates of 386,653.

For the 1952-53 heating season, 244,000 will be made, as compared with the original estimate of 348,222.

The relative soundness of such guestimating can be judged on the fact that the *GAS* survey covered, for 1951-52, slightly more than 29% of the potential and for 1952-53, 23%.

Carrying such guestimating further, and assuming that all other states reported in the AGA survey are installing (and will install) exactly as many househeating jobs as they planned to a year ago, the nationwide totals for both years would reach 1.7 million. This is a dubious assumption, however, because of other factors which have combined to reduce the estimates. Other states will still not get all the natural gas they had hoped for at the first of the year; furthermore, sales have not held up as well as anticipated a year ago, when the tide of optimism over probable demand was running high.

Although the state of Michigan is not covered in this report, Consumers Power Co. in Jackson has been busy connecting 10,000 new space heating customers under authority from the state public service commission and PAD.

The agencies granted approval after the company submitted evidence that it can serve the extra 10,000 without jeopardizing natural gas service to defense industries or to other customers. If applications numbered more than 10,000, they were to be eliminated by lot.

Nonetheless, the PAD order will not have the drastic effect that was once predicted. In fact, in the New England states the delay in the arrival of natural gas has been the chief deterrent. In Connecticut, for example, out of six companies reporting, three intend to add just as many jobs as originally planned, but all jobs will be delayed one year because of the tardiness of natural gas. The others declined to prophesy the future, but stated plainly that it's purely a matter of "if, as, and when" the Texas fuel arrives.

Increase in Massachusetts

In Massachusetts, on the other hand, with natural gas now beginning to find its way into a number of systems, four companies have raised their sights while a dozen have reported "no change." The net effect is a substantial increase for the state (see table).

Both Connecticut and Massachusetts are under direct PAD control.

In the seven states that have certified, local orders of varying degrees of stringency are being applied. Maryland adopted the PAD order for its own control, but it will have no effect upon the immediate plans of the one company replying to the survey. New Hampshire certified, but at last reports its exact plans were indefinite; it won't get natural gas until next year and its companies will likely be exempt. Ohio merely retained its old orders, which were strict enough. Two major utilities which were expected to add nearly 50,000 this year and 42,000 next have scaled down their estimates to 19,000 and 11,000 for the respective years. A third, however, has upped estimates by nearly 3000.

Little Change Here

Pennsylvania already had some restrictions on the use of gas for househeating, so now that it has certified most companies find themselves in the same position as they were before the PAD order. Two of the largest utilities report no changes in plans. Another company has substantially upped its estimates for both years, while a fourth shows a small reduction in 1951-52 and a drastic cut next year, based on restrictions. Overall, the state shows an increase for this year, a decrease for next. Neither Virginia nor West Virginia participated in the survey. Wisconsin, which adopted the PAD order temporarily until it can set up its own regulations, showed a little temporary trimming.

Results of the survey are shown in condensed form in the table.

NUMBER OF HOUSEHEATING CUSTOMERS TO BE ADDED

	Reported to AGA		Reported to GAS	
	1951-52	1952-53	1951-52	1952-53
Connecticut	394	458	161	403
Delaware	800	800	800	800
Maryland	110	162	110	162
Massachusetts	974	3,521	1,499	4,149
New York	2,695	2,500	1,565	2,500
New Jersey	1,100	900	2,300	2,000
Ohio	77,100	62,400	46,035	34,800
Pennsylvania	25,753	24,789	27,700	22,150
Wisconsin	800	—	435	—
Total	109,726	95,530	80,605	66,964

[1]GAS, June 1951, p. 55.

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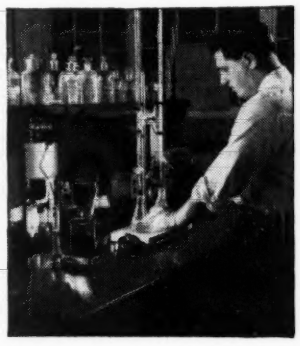
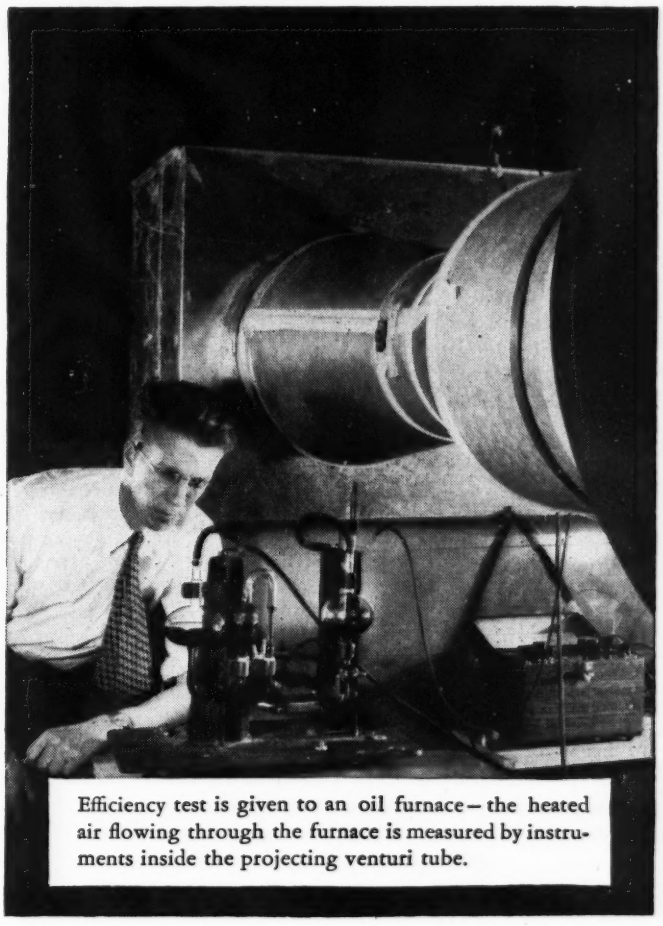


Even chemistry is brought into furnace tests. Here a zinc plating solution is tested for use on many furnace parts.



Efficiency test is given to an oil furnace – the heated air flowing through the furnace is measured by instruments inside the projecting venturi tube.

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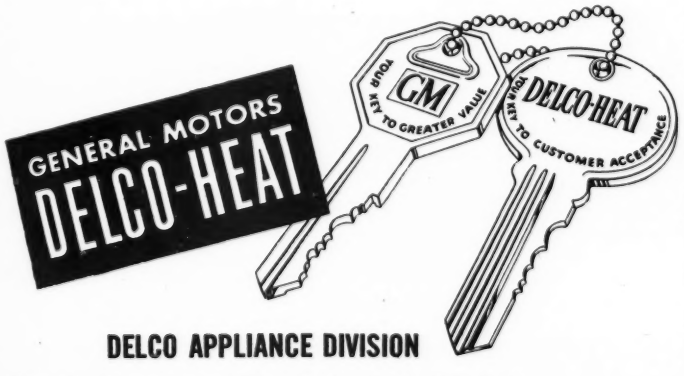

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convention report

A sampling of opinions of state regulatory commissions as expressed at the annual convention of NARUC

Seeking a Sound Basis for Ratemaking

THE INFLATIONARY price spiral has continued to rise without material abatement since the report of the NARUC Committee on Valuation was presented at the Cleveland convention upon the subject "Rate Base Stability in a Period of Fluctuating Costs." In that report it was suggested that while "original cost less depreciation" is the most reliable criterion, it cannot be used as the sole determinant of the rate base. It was pointed out that some consideration must be given to present day prices where too great reliance on original cost data would produce unreasonable results in view of the rapid cost fluctuation.

Since that time the continuing inflationary trend has accentuated the problem. Utilities are urging a return to little used valuation processes of other decades. Various commissions have moved in that direction. Financial experts are urging methods of compensating for dollar inflation by reference to cost indices. Everyone concerned is apparently groping for a yardstick that can be used to give a more direct reflection of the upward spiral in rate base fixation. The Committee on Valuation, therefore, considers that further consideration of the available valuation factors and methods is appropriate at this time.

Today's Prices

More and more frequently in the last few years utilities have urged state and federal commissions to give greater consideration to present day prices in rate proceedings. Some utilities have brought forward evidence of cost of reproduction new. Others have urged that the accretion in value of existing property, because of present day prices of labor and materials, must be recognized in passing upon the issue of securities or in rate adjustments. Still others have advocated the use of price index data available in federal departments as a means of reflecting present day costs in valuation and depreciation determinations.

In operations where there is a rapid turnover and small investment in relation to gross revenue, the operating ratio is being advanced as a more reliable index of revenue needs than any concept of return on a rate base. More and more the testimony offered stresses the amount of return needed for sound financing as a basis for rate determinations even when the end result indicated would necessitate an unusually high return related to customary valuation data.

It has been urged that valuation criteria based on original cost less depreciation are of questionable value in a period of inflation or deflation unless this period is a "part of cycle of a regular pattern of a reasonable duration over the life of which prices will average out at a level equivalent to the average value of the 'original cost' dollar invested."[1] The present inflationary period is said to be too extended to permit reliance upon such data.

The reaction of regulatory bodies which have heretofore tended to rely strongly on original cost less depreciation to such contentions has not been consistent with past policy nor has it been wholly clear. The Michigan commission, over dissenting opinions, has attempted to give effect in part at least to present day prices in a determination of "fair value" in two rate cases.[2] The commission fixed a "present fair value" which it said was not either original cost nor a rate base in terms of 1949 dollars, but somewhere between those bases. In a later case decided Jan. 8, 1951, the Michigan commission adopted a net investment rate base.[3]

In the *Chesapeake and Potomac Telephone* case, NARUC Bul. No. 72—1950, the Virginia commission gave no weight to reproduction cost new and pointed out that 43% of the company's original cost was incurred since the close of World War II at the highest prices in the company's history. It allowed a 6% return on original cost less depreciation plus an allowance for materials and supplies and working capital.

The California commission in a decision dated Feb. 8, 1949, Re: *California Water Service Co.*, PUR Annual 1950, 341, used the following language:

> *An evaluation of a water utility's property for rate making should be predicated on a historical cost rate base notwithstanding the effect of spiraling prices on future plant costs, indicating that present facilities could not be replaced at present price levels, as this base is neither too speculative nor diffiult to ascertain and will not result in any injustice provided proper recognition is given to the utility's financial needs in the allowed return.*

The Pennsylvania commission in a decision dated Dec. 18, 1950, Re: *Pennsylvania Public Utility Commission* v. *Vandergrift Telephone Co.*, 87 PUR N.S. 123, used the following language:

> *Original cost of utility plant is not the controlling factor in determining fair value. Reproduction cost at fair average prices, is also of much importance, and it is fair value upon which a fair return must be allowed.*

Cost-of-Money Basis

The Wisconsin commission has stressed cost of money consideration as justification for the allowance on an original cost less depreciation rate base of a rate of return somewhat in excess of that ordinarily considered adequate, and has given much weight to operating ratio data in motor carrier transportation cases.

The many advantageous features of the original cost less depreciation factor in rate base determination should not be overlooked or lightly discarded. With adequate continuing property records, the necessary factual data are readily available and accurate. It has the virtue of stability over the years.

[1] Ross, Clarence H. Compensating for Dollar Inflation in Rate Regulation, *Public Utilities Fortnightly*, Vol. XLVII, No. 11, May 24, 1951.

[2] *Consumers Power Co.* case, NARUC Bul. 28—1950; *Michigan Bell Tel. Co.* case, 85 PUR, 327, NARUC Bul. 66—1950.

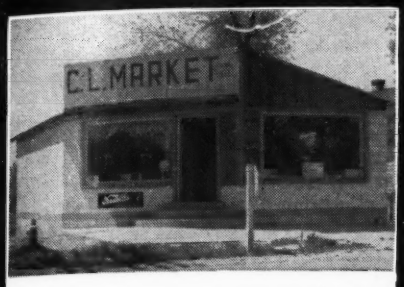
[3] Re: *Michigan Associated Tel. Co., Public Utilities Fortnightly*, Vol. XLVII, No. 11.

A keen appreciation of current problems of gas utilities was evinced at the 63rd annual convention of the National Assn. of Railroad & Utilities Commissioners held at Charleston, S. C., Oct. 16-19. The briefed reports presented on these pages were excerpted from addresses and committee papers delivered at that time.

Elimination of dual regulation of utilities is one of the goals of the association, and its efforts in this direction were shaped into a resolution (one of 11 adopted) to amend Sec. 1 of the Natural Gas Act, "as amended." A subsection (c) would be added to the act, to read as follows:

"(c) That the provisions of this act shall not apply to a person engaged in or legally authorized to engage in the local distribution of natural gas or to any facilities used or to be used by such person to transport, whether or not in interstate commerce, natural gas received by such person within or at the border of a state to points of consumption within such state:

"PROVIDED, HOWEVER, that this subsection shall be operative only if none of such facilities is used or to be used for or in connection with the sale of natural gas in interstate commerce for resale or for or in connection with the transportation of natural gas in interstate commerce for hire. To the extent that exemption from the provisions of this act is afforded by this subsection, the matters exempted are hereby declared to be matters primarily of local concern and subject to regulation by the several states."



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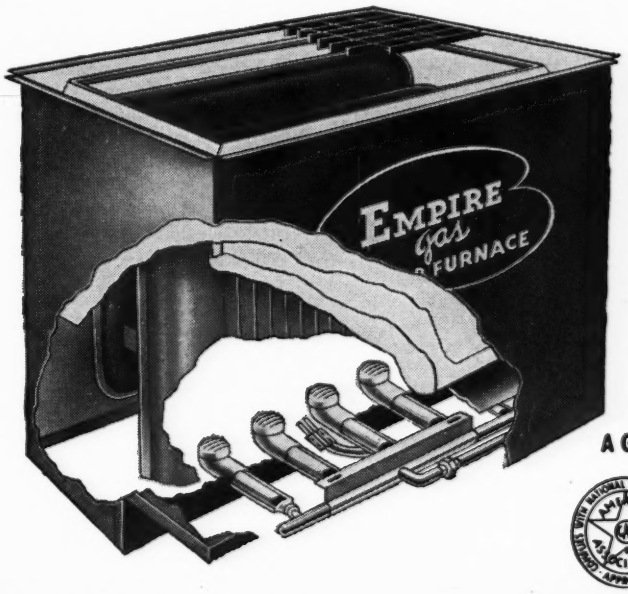

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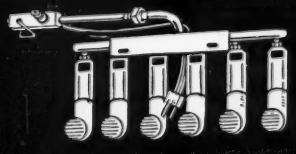

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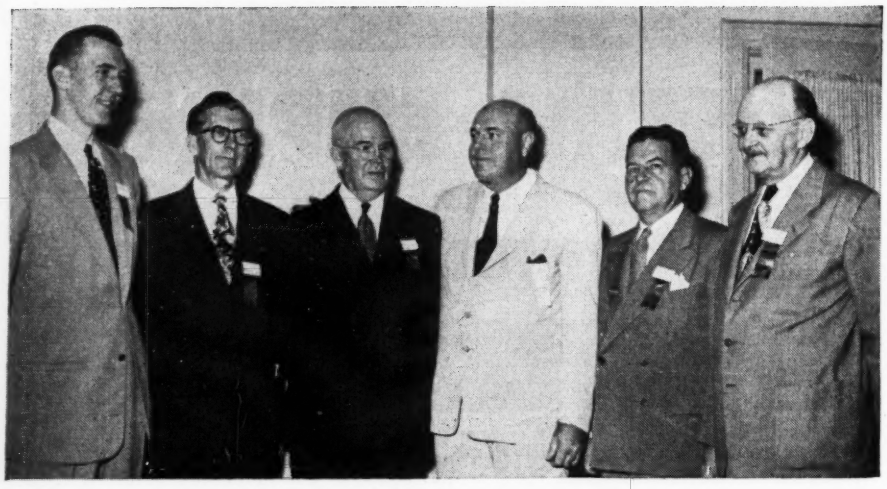

NARUC 1951-52 officers and outgoing president are, from left, Austin L. Roberts Jr., assistant general solicitor and secretary-treasurer; C. L. "Roy" Doherty, South Dakota, second vice president; George H. Flagg, Oregon, president, 1950-51; J. C. Darby, South Carolina, president, 1951-52; Eugene S. Loughlin, Connecticut, first vice president; John P. Randolph, general solicitor.

It results in the ultimate reflection of all price changes in the rate base insofar as such price changes affect investment in new actual construction or replacements involving new capital expenditure. Its use tends to prevent unusual peaks or valleys in the rate curve and hence avoids the distressing disturbances incident to the use of unsaleable rates—for the lag of rate making inevitably will carry over the higher rate scale of an inflationary period into the succeeding period of deflation.

In a period such as that experienced since the close of World War II when unprecedented new construction has gone forward, the cost of such new construction at present day prices can be immediately reflected in the capital structure and the rate base. These and other advantages are well worth preserving in the interest of effective regulation.

Wide Discretion

What then can be done to make these criteria more reliable and acceptable in an extended period of rapidly rising prices such as that now being experienced? In the first place, the rate of return to be allowed is a variable and within certain limits—i.e., value of service on the high side and confiscation on the low side—a commission has wide discretion to exercise in fixing the reasonable rate of return. No doubt there will be instances, especially in the transportation field, where needed earnings from the viewpoint of money cost will far exceed the usual allowable rate of return in an original cost less depreciation rate base.

In the case of most electric, water, gas, or telephone utilities a reasonable variation of the rate of return can be used effectively to provide the dollar amount of return which special conditions arising from inflationary costs indicate to be necessary to healthy utility operation.

Both before and since the Hope case, 320, U. S. 591, commissions have given consideration to money cost or the cost of capital as a factor in rate making. This factor is of great value in determining what dollar amount of return is needed to permit the utility to perform its public service in a healthy, efficient manner.

Both utilities and commissions have gone deeply into this type of investigation and have placed much reliance on the results. These criteria, however, must be related to some valuation determination and it is submitted that the original cost less depreciation factor is more appropriate than any other for this purpose. This is especially true because the *rate* at which capital can be obtained has not followed the inflationary spiral of prices.

Although there has recently been an increase in yields on utility bonds, following the increase in the interest rate on U. S. government issues, cost of utility capital still remains at reasonable levels. Unless or until the investing public demands higher yields in order to induce it to invest in utility securities, no reason exists for higher rates of return to utilities because of inflation in the general price level.

Utility Stability

From its sheltered position a utility should not expect to reap profits comparable to those which are gained by unregulated free enterprise which is in a position to take advantage of every inflationary entrepreneur opportunity, but which must also be subject to the corresponding competitive risks. This disadvantage is offset by the fact that, with some exceptions, utilities can maintain their earnings at a higher level under unfavorable economic conditions than competitive industries for the very reason that they are sheltered from direct competition.

The resulting stability of utility earnings over relatively long periods is desirable from both the public and the utility viewpoint and is possible with adequate and forward looking regulation. The use of original cost less depreciation as a valuation working tool will help to produce and maintain that stability.

No rigid yardstick is available which can be applied mechanically to valuation problems in an extended inflationary period such as is now being experienced. Commissions must as always give due consideration to all available factors in reaching conclusions as to valuations and rates of return thereon.

—NARUC Committee on Valuation

Excess Profits Taxes Hurt the Customer

AT THE 62ND ANNUAL convention of this association, held in Phoenix in November 1950, the report of the Special Committee on Excess Profits Tax (contained in the proceedings for 1950, p. 200) was adopted, and the Hon. John H. Hessey of Maryland and the Hon. H. Lester Hooker of Virginia and the legal representatives of this association were authorized to appear in behalf of the association before meetings of any committee of Congress which might be thereafter held upon legislation relating to excess profits taxes, and to present the views of this association as contained in the aforesaid committee report.

Acting pursuant to the resolution of the executive committee, the NARUC Special Committee on Effect of Taxes on Utility Rates expressed its desire to present the views of the association before the Congressional committees, and during the hearing opportunity was again afforded the representative of this committee to appear and present the views of the association.

John H. Hessey appeared before the House Ways and Means committee on March 9, 1951, and because of the short notice which had been given, he was compelled to present extemporaneously the views of the association. The recommendations of the committee were not adopted in the bill, as enacted by the House of Representatives. Mr. Hessey again appeared before the Senate Finance committee on Aug. 1, 1951, and again submitted the views of the association, both by submission of a written statement

ADDITIONAL GROSS REVENUES REQUIRED TO OFFSET EFFECT OF VARIOUS INCREASES IN FEDERAL INCOME TAX RATE

(Chesapeake & Potomac Telephone Co. of Baltimore City)

A. Taxable income—First 6 Months 1951—Annual Basis.....$14,533,000
B. Additional gross revenues required to offset effect of increases in tax rate:

	Increase in Tax Rate From	To	Increase In Federal Income Tax	Portion of Additional Gross Revenues Retained As Net Operating Income	Additional Gross Revenues Required to Offset Effect of Increase in Taxes
	(a)	(b)	(c)	(d)	(e) = c ÷ d
1.	47%	48%	$ 145,000	50.29%	$ 288,000
2.	47%	49%	291,000	49.32%	590,000
3.	47%	50%	436,000	48.35%	902,000
4.	47%	51%	581,000	47.39%	1,226,000
5.	47%	52%	727,000	46.42%	1,566,000
6.	47%	53%	872,000	45.45%	1,919,000
7.	47%	54%	1,017,000	44.49%	2,286,000
8.	47%	55%	1,163,000	43.52%	2,672,000

(excerpts below), and extemporaneous remarks.

At the present writing the Senate Finance committee is giving consideration to the views expressed at the hearing, and we can only hope that the views of the committee will find embodiment in the bill which will be finally enacted.

Statement of John H. Hessey

Any additional tax imposed upon regulated public utilities will, generally speaking, reduce their net income below the amount which the several state regulatory commissions have fixed as a fair and reasonable return to the utility. Therefore, if an increased income tax rate is made applicable to regulated utilities, it would be *mandatory* on the several state commissions to allow an increase in rates, in order to enable them to earn a reasonable return. Upon failure of the commissions to do so, resort could be had to the state and federal courts, and such courts would be compelled to reverse the commissions.

The commissions favor an excise tax to be paid by patrons of all utilities. Such a tax would not require them to increase rates. This is a just and fair solution. To assess additional taxes against the regulated utilities would require them to collect more than double the amount of taxes from their customers, and all of this additional sum would be paid to the government. This is unjust discrimination against regulated utilities—rather, it imposes a double obligation on the people (customers) themselves.

Illustrations are legion; one will suffice. Taking one public utility, The Chesapeake & Potomac Telephone Co. of Baltimore City, as an example, a tabulation has been prepared (see table) showing the additional gross revenues required to offset the effect of the various increases in the federal income tax rate from 47% to 55%. It will be noted therefrom that the additional gross revenues required to offset the effect of the increase in taxes is more than double the increased federal income tax, when the income tax is increased to 49%. It will be further noted that, as the tax rate is increased upward from 50%, the additional gross revenues required to offset the effect of the increase in taxes, goes up in greater proportion.

Why force regulated public utilities to apply to state regulatory bodies for mandatory increases requiring that customers pay more than double the tax which Congress seeks to secure by an increase in the income tax rate? The answer is obvious. An excise tax levied upon the consumer in an amount sufficient to meet the estimated income to be derived from the public utilities is the answer.

The national association also takes the position that an excise tax should fall alike on all users of the services of all utilities, regardless of the nature of the ownership or operating organization of the utilities. If a tax is to be imposed upon one public utility, it should be imposed upon all. If it is not, then the customers of a cooperative group or a government-owned utility would be favored, for neither such utility nor the consumer would pay any part of an increased income tax imposed for the welfare and defense of this country. There should be no discrimination between utilities, whatever their character, nor between the customers of any utilities.

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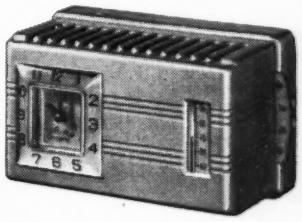

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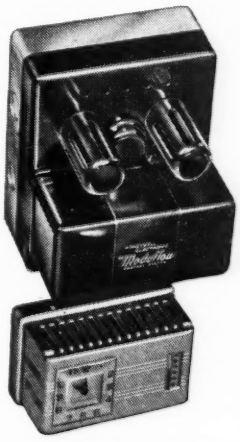

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The imposition of an excise tax would reach customers of cooperatives and government-owned utilities, and those now paying nothing by way of income or excise tax would be subjected to a fair share of the tax and some of the discriminations which now exist would be eliminated.

—*NARUC Special Committee on Effect of Taxes on Utility Rates*

Rates and the Customer

UTILITY COMMISSIONS throughout this land have steadfastly protected the interests of the people and have constantly refused to increase rates more than is absolutely necessary, and while their paramount duty is to see that only reasonable rates are charged, there exists the correlative obligation to allow a public utility to earn a just return on the fair value of its property used and useful in the interest of the public.

The task now confronting us as commissioners is becoming increasingly difficult. Ratepayers have been surfeited with increases and want no more of them. The utilities are having a difficult time keeping pace with rising costs and are becoming as restless as a colt under the saddle.

Regulatory bodies must always be on the alert to see that adequate and dependable utility services are rendered at just and reasonable rates. They also have the duty of seeing that the utilities are permitted to charge rates that will produce a fair return to the owners of utility properties. It is important that utility earnings be maintained at a level high enough to attract capital so that the necessary improvements and plant expansions can be adequately and economically financed. Otherwise, service to existing customers will be impaired and new potential customers will not be served. These are simple truths that those in the regulatory business recognize and understand but to get the average ratepayer to recognize and understand these principles is an entirely different, if not impossible, thing.

His resentment against a rate increase is not soothed or tempered by the fact that the costs of utility services have not advanced to anything like the extent to which other costs have increased. He takes the position which indicates that, in his judgment, there is something magic about utility regulation that should make it unnecessary to increase rates.

A look at some of the economic indicators, as taken from Department of Labor statistics, shows that from 1948 to June, 1950 there was little change in the cost of living, average hourly earnings, and wholesale prices. There was strong reason to believe that we had reached a plateau, that prices and costs were on an even keel.

Utility regulation under current rising costs conditions again becomes perplexing, troublesome, and difficult. That old plateau of 1948 to early 1950 is no more.

Of the many problems facing utilities and regulatory commissions alike, the most serious is that of a fair determination of rates in the light of the rising costs the economy of this country has experienced since the happenings in Korea. Much has been said by federal officials and economists about controling the inflationary spiral—note that the expression is "controling" and not "halting"—and the Bureau of Labor index of living costs continues to rise.

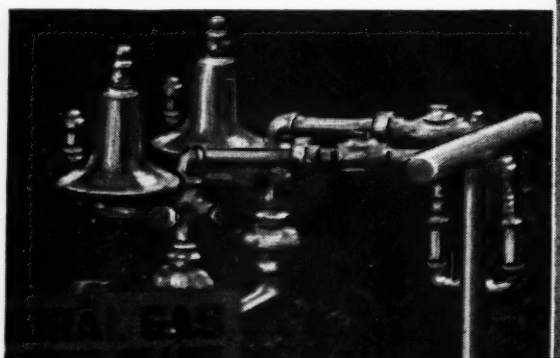
The basic commodities that utilities convert into their products or services have all increased in cost, and give no indication of not going higher. In addition, the burden placed upon enterprise by the federal government in the form of taxation, and particularly income taxes, has increased drastically and is almost certain to go still higher.

The utility does not like to increase its rates because it realizes that in most instances a rate increase stirs up some degree of public resentment. Also, application to a regulatory body must generally be made, a process that is frequently time-consuming and expensive when determined opposition is encountered. On the other hand, the utility has no alternative but to seek higher rates if it is unable to control its costs.

By the same token it is incumbent upon the regulatory body to grant higher rates where a need for such has been clearly demonstrated. Courts have universally held that rates producing less than a fair return are confiscatory, and they will grant rates that will produce a fair return to the utility. It is in the determination of what constitutes a fair return that the controversies arise, and it is in the examination of all the factors that must be considered that the utilities and regulatory bodies can best serve the public.

One of the most important factors to determine is the rate of return that a utility should earn in order to fairly meet its needs. There is no set figure that can be broadly applied, but rather the determination of

A WIDER RANGE
... of Delivery Pressure Control



REYNOLDS HIGH PRESSURE LINE REGULATORS in parallel hookup have an increased range of capacity as well as a wider range of delivery pressure control. This also provides greater margin for emergencies. On inlet pressure the range is up to 650 pounds. For outlet pressure, this unit assures absolutely accurate and dependable control from 2 to 100 pounds. This variance in outlet pressure is made by use of different sizes of diaphram cases and further flexibility in the spring type is possible by use of different strength springs.

BRANCH OFFICES

H. D. "MIKE" MEUFFELS
423 Dwight Building
Kansas City, Missouri

SEIDENGLANZ & CO.
2nd Unit, Santa Fe Building
Dallas, Texas

REPRESENTATIVES

EASTERN APPLIANCE COMPANY
Boston, Massachusetts

WALDO S. HULL
163 W. Queen Lane
Philadelphia, Pennsylvania

Reynolds Gas Regulator Co.
ANDERSON, INDIANA, U. S. A.

GAS CONTROL SINCE 1892

such a rate has come to be something in the nature of a science. The so-called "cost of capital" theory is urged as one method of determining a rate of return.

Along with other costs, the cost of money has risen. Great care should be exercised so as not to let the rate of return rise any more than is necessary, for an increase of .5% upon a $100 million rate base will require additional gross revenue of approximately $1,042,000 after the effect of a federal income tax rate of 52%.

A second basic factor in need of determination is what is commonly referred to as the rate base. Whether it be a rate base determined after consideration of original cost of plant as one element, together with some other form of valuation, such as reproduction cost, or whether it be a prudent investment rate base, the same problem of rising costs obtains.

Most utilities have greatly increased their facilities during the higher cost period and, hence, the commissions in those states adhering to the fair value or reproduction cost theory would have to add but little to the original cost of such plant to establish an appropriate rate base. But a more exacting and searching analysis of the various elements comprising the rate base may disclose luxuries that could be reduced.

To be more precise, a study of the cash working capital requirements may show that the old rule of thumb of one month's cash expense is completely inequitable. It must be remembered that really large amounts of cash are collected monthly from customers for future payment of taxes, and while so held can be and are used for other purposes, thereby relieving the investors from supplying such cash. This is an example of where a rising cost on one hand, that is, federal income taxes, can be used to alleviate the impact of some other requirement.

Another element of rate base that should be given careful study is that of construction work in progress. Some utilities follow the practice of capitalizing interest during construction while others do not. Also, there seems to be no uniformity as to the inclusion or exclusion of construction work in progress in the rate base. It appears to me that here is a field that can well be explored.

—John H. Hessey, chairman
Maryland Public Service Commission

Amending the Act

AMENDMENTS TO THE Natural Gas Act that will clearly define the field of state and federal regulation continue to constitute a problem of greatest importance to most of our commissions. State commissions desire to regulate the activities of natural gas companies within their states, to have jurisdiction over transportation and all sales within their borders. Federal court decisions have been almost uniformly against the state bodies, and dubious and indefinite wording of any proposed legislation makes it worthless and generally ineffective. I quote from a letter to the Washington office, from one of the state commissions:

In light of the importance of the subject under discussion, we emphasize the necessity for this proposed legislation being made so clear and comprehensive that no possible doubt may be entertained as to its intent. In view of the decisions of the U. S. Supreme Court on the matter of sales of natural gas in interstate commerce for resale, it becomes absolutely necessary in our opinion that S-1084 as now drawn, be so amended that sales of natural gas in interstate commerce for resale be clearly embodied in the bill. No doubt then could arise that it is the intent of this proposed legislation to take from the Federal Power Commission and to grant to the states such jurisdiction where the sale and delivery of natural gas in interstate commerce takes place within the territory of a single state.

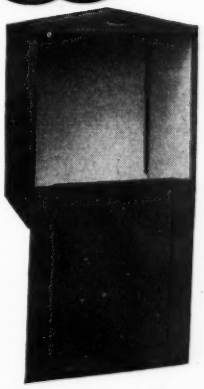
I am in full accord with the foregoing sentiments. Similar definite and unequivocal amendments should also be made to the Federal Power Act.

Another serious problem, becoming more and more aggravated, and entirely due to today's tax structure, is the increasing burden placed on the ratepayer when new financing is done with equity rather than debt money. There can be no doubt as to the importance of a sound financial structure, with a reasonable debt ratio, but the tremendous difference in the cost of the two methods, to the ratepayer and without additional return to anyone but the tax collector, constitutes a real problem.

—George H. Flagg
NARUC president

Protect Your Meter Investment with a **METER HOUSE**

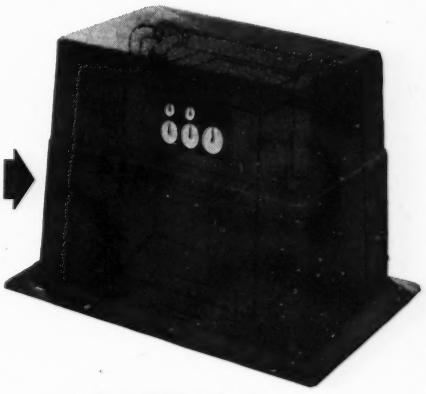
INDUSTRIAL METER HOUSE



for orifice meters, recording, thermometers, D P cells, etc. Steel construction, insulated against weather. Baked auto enamel finish.

Size: width 21", depth 15", height 26".

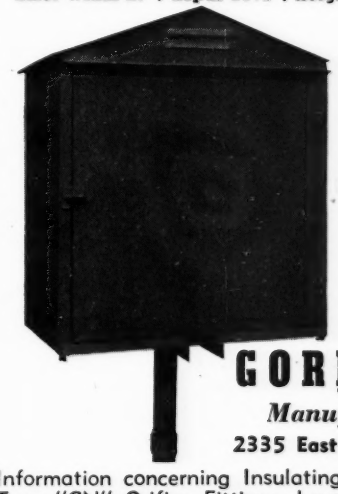
ZENALOY METER HOUSE



A protective and decorative cover for residential installations made of molded Fiberglass construction. Impervious to all weather and soil conditions. Will not rust or warp. Light, strong and easy to install.

Size: width 27", depth 18½", height 22".

"TILTBACK" ORIFICE METER HOUSE



for all types of orifice meter installations, convenient for making repairs or calibrating meters. Fabricated from 22 gauge sheet metal. Weight approximately 50 lbs. Easily assembled.

Size: width 26", depth 16", height 32".

(Special houses made to your specifications)

GORDON Z. GREENE CO.

Manufacturers of Oil & Gas Specialties

2335 East Eighth St., Los Angeles 21, Calif. TUcker 1279

Information concerning Insulating Bushings & Nipples, Plastic Tubing, Commercial Type "CN" Orifice Fittings, Leveling Saddle, Bored & Calibrated Meter Runs and Straightening Vanes, sent on request.

NEWS

Manufacturers

Appliance Outlook Good For Early 1952—Massey

Public demand for gas ranges, water heaters, and home heating equipment will be met by the gas appliance industry during the first half of 1952 through aggressive merchandising and production-line ingenuity, without resort to "war emergency" models, Harold Massey, GAMA assistant managing director, predicted last month.

Speaking at the Mid-Southeastern Gas Assn.'s annual meeting in Raleigh, Nov. 8-9, Mr. Massey said that the increased rate of industrial production of all types, a sharp rise in installment buying, and a "break at last in the public's buying apathy" have contributed to a "bullish" outlook for the gas appliance market, despite materials limitations, corporate and excise taxes, and price controls which will prevent the industry from matching last year's record volume.

"There will be enough gas ranges to meet all demands until the second quarter of 1952, when some delivery problems could develop," he said. "These ranges will be built to traditional standards of quality and performance, and there will be no 'victory' models of the type produced during World War II."

Water heaters of all types, except those incorporating storage tanks of copper or monel metal, will be available. Construction and performance standards will be maintained, Mr. Massey said, although tanks may be galvanized on the inside only to save zinc. The trend will be to larger tanks to provide adequate hot water supplies.

Production of home heating equipment will keep pace with essential home construction and modernization, with sales efforts directed particularly toward parts of the country which are not affected by government-imposed gas restrictions. Lines of this equipment, Mr. Massey stated, will be simplified to some extent, without effect on efficiency.

The outlook for gas refrigerators, although clouded by materials shortages, is favorable, particularly in terms of top quality models, he said. During the past year, public acceptance of such models has been exceptional and will dictate the design of new lines to be introduced early in 1952.

Commercial cooking equipment, no longer subject to a manufacturer's excise tax, will be in demand for needed replacements in public and institutional eating places, as well as new establishments, and output is expected to be adequate except in certain stainless steel models.

It will take time to meet rapidly growing demand for gas-fired incinerators and gas laundry dryers, he said. Design of these appliances will remain unchanged, but while supply of the former will take care of all foreseeable demand, dryer production is not likely to keep up with orders.

"There has been a tremendous increase in the call for industrial gas equipment," Mr. Massey said. "With almost every type of civilian and military production requiring heat processing, the makers of such equipment are working round-the-clock to produce the goods. Meter, valve, and controls manufacturers are kept busy turning out products needed to meet the fast-growing demands of the gas appliance and equipment markets.

"Stocks of household durables in our industry are dropping from an uncomfortably high position to more nearly normal levels. A factor which will influence the industry's output in the coming year is present and expected government regulation of critical metals, principally steel, copper, aluminum, nickel, and cobalt."

Such regulation, he pointed out, involves three phases: limitation, simplification, and conservation. The first phase already is in effect, with the likelihood that gas appliance manufacturers will be operating in the third quarter of 1952 with roughly 50% of the steel, and lesser quantities of other critical metals than were available before Korea.

The simplification phase, Mr. Massey explained, might involve reduction of the number of models and standardization of parts. "So far," he added, "the simplification program has not appreciably affected our products, but some of the manufacturers have taken the step voluntarily without government request."

As for conservation measures, moves are being made in Washington now that will affect various types of appliance manufacture. "For example, certain house heating boilers soon may be shipped without steel jackets," he said. "For insulation, a coat of plastic asbestos, applied in the field, will have to suffice. Manufacturers making boilers with standard and de luxe or 'extended' steel jackets soon will be permitted to supply either type of jacket, but not both."

There is a possibility of further local restrictions on the supply of gas available for house heating and industrial purposes, he said. "A shortage of steel for necessary pipelines, loops, and extensions is involved. It is most encouraging, however, that PAD feels that industry itself can do a better job than the government of averting gas shortages in essential industrial plants."

Both price decontrol and establishment of a positive federal production balance between military and civilian production, Mr. Massey said, would take a lot of the guesswork out of the industry's planning. He urged all manufacturers to accelerate merchandising programs, pointing out that "in other times of stress, when deliveries were threatened by similar emergency conditions, companies with aggressive sales policies fared especially well in their effort to serve the public and the industry."

Duncansville Plant Opens

Potential sheet metal products capacity of the National Radiator Co., Johnstown, Pa., will be increased by about 150% with the addition of the firm's new Duncansville, Pa. plant, officials estimate.

More than 1000 persons attended an open house dedicating the $1¼ million installation on Oct. 18. Although the plant is not yet completely equipped, visitors saw the paint applicator system, drying ovens, steel washing unit, press brakes, shears, and offices, dispensary, locker rooms, and special displays of the company's products.

Three new lines which National Radiator will manufacture are gas conversion burners, heat transfer equipment, and oil burners.

Cooling Unit Assembly Tests Reported by Servel

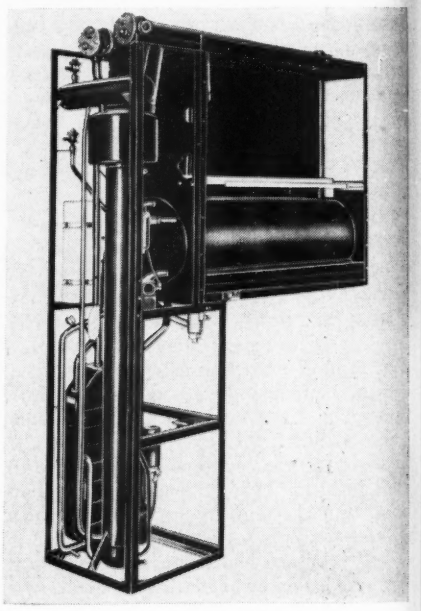
After a year of field testing, Servel Inc., Evansville, Ind., has introduced an assembly plan for combining multiples of 5.4-ton cooling units into heavy duty air conditioning systems. The plan was developed by the Servel laboratories and results of tests were announced at the firm's first air conditioning conference in Chicago, Nov. 9.

"Our experience," said John Knighton, vice president in charge of sales, "proves the complete practicability of combining from 2 to 40 or more 5.4-ton units to provide equipment for large air cooling requirements. Formerly, big motor-driven compression-type equipment would have been used for such installations. Now, with Servel's assembly plan, the cooling demand can be met with no-moving-parts absorption equipment and gas can be used to supply the energy."

Two or more of the units may be combined, like building blocks, to produce an assembly with heavy cooling capacity.

Many applications have been found, too, for the company's 25-ton absorption-type water chiller which is a hermetically sealed vacuum system that operates without moving parts. Widely used for both comfort cooling and industrial processing, the chiller weighs 2500 lbs and can be installed on any floor of a structure.

At the same Chicago meeting, Servel unveiled an oil-operated unit that cools in summer and heats in winter, thus making year-round air conditioning available to the more than 9 million homes using oil heat.



Adaptability of this Servel 5.4-ton steam-operated absorption refrigeration unit permits it to be combined in assemblies of 2 to 40 units to operate heavy-tonnage air conditioning installations.

Show her how to walk out on Cooking Cares
...with a new "Insta-Matic" Clock

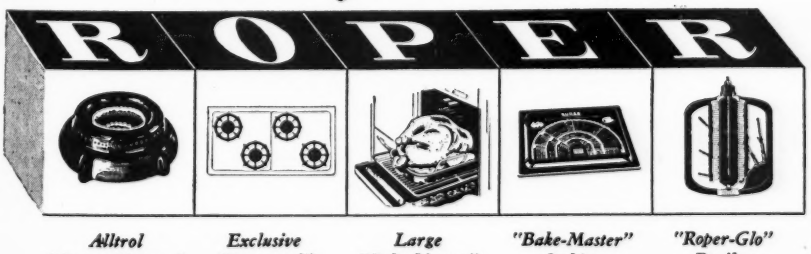
You'll find prospects really perk up and take notice when you tell them about automatic cooking and explain how simple it is to use the ROPER "Insta-Matic" clock control. • Here's fully-automatic oven operation that completely eliminates watching and waiting. From the time she places a roast or full meal in the oven until she removes it, tender and delicious, she is free to take the path of her choosing even though it leads many miles away. • Ask us about the distinctive line of ROPER Gas Ranges. They're engineered for use with any gas, including liquefied petroleum gas. Consider Roper now!

Gives You More "Sell" in

ROPER

"America's Finest Gas Range"

Crowning Achievements



Alltrol "Center-Simmer" Burners | *Exclusive "Staggered" Cooking Top* | *Large "Bake-Master" Oven* | *"Bake-Master" Cooking Chart* | *"Roper-Glo" Broiler Burner*

Geo. D. Roper Corporation
Rockford • Illinois

Offices and warehouses in principal distribution centers

Newsnotes

Barrett Division, Allied Chemical & Dye Corp., New York, has placed an order with American Car & Foundry Co., New York, for 100 all-welded tank cars of 12,500-gal. capacity. These 70-ton cars will be fully insulated and equipped with steam lines to facilitate unloading.

Engineers Sales-Service, Long Beach, has been appointed California representative for the Welsbach Corp., Kitson Division, Philadelphia. Earl E. Ivins, head of Engineers, will have two salesmen to assist him in covering electric and gas utilities and original equipment manufacturers in the state.

White hot steel streaming into a huge ladle marked the opening on Oct. 30 of the first of 11 giant open hearth steel furnaces at the Pittsburgh works of Jones & Laughlin Steel Corp. The 11 furnaces, which will cost $70 million, are expected to be in full production by next March. They will produce 2 million tons of steel annually.

Sales and Promotion

Detroit Promotion Scheme Piles Up Sales Records

Last month, Detroit-Michigan Stove Co., Detroit, released details on how its "Operation Jambuster" works and reported that the promotion is now piling up sales records for dealers all across the country.

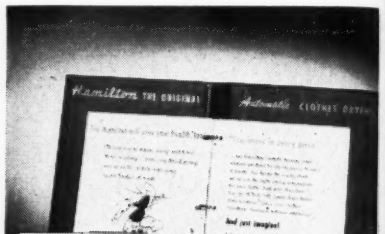
As previously reported (Nov. *GAS,* p. 92), two dealers were chosen to test the soundness of the plan. Pearsons Furniture & Music Store, Indianapolis, and May Appliance Co., Aurora, Ill., found that the special sales and advertising efforts slightly reduced profit per range but the tremendous increase in unit sales resulted in greatly increased profits. Moreover, both dealers agreed that the plan offered by Detroit-Michigan embodies sales principles so sound that they could be applied to any item.

Since experience has proved that a large percentage of persons who see an effective demonstration can be sold, both dealers offered, through newspaper ads and canvassers, a set of salt and pepper figurines to adults who would come to the store for a range demonstration. The five basic Detroit-Michigan ranges were displayed on the floor, and a featured range was in a conspicuous store window. Gimmicks such as a whistling teakettle equipped with a thermometer to demonstrate instant control and flexibility of burners were used during sales talks.

Elements of the test program included the following:

Advertising. The Aurora dealer used 179 column inches in morning and evening papers; the Indianapolis dealer used 190½ column inches. Both sent explanatory letters on the campaign to a selected list of customers and prospects.

Sales Refresher. At a kickoff meeting, a factory salesman gave a thorough range demonstration for retail sales people, and then he remained throughout the campaign as an observer and assistant. A daily progress report was arranged, as well as a suggestion interchange for salesmen. Small cash prizes for achievement were set up, and non-sales em-



A new national advertising campaign got under way in November for Hamilton Manufacturing Co., Two Rivers, Wis. Featuring the headline "And then she got a Hamilton automatic clothes dryer," ads are appearing in six national magazines.

Shown above are two sales easel books, part of the promotion. One is a miniature planned as the distributor salesman's presentation, and the larger book, which tells the Hamilton story in consumer language, is designed to stand on a dryer in the store.

In addition, a display card for local tie-in with the campaign has been prepared, and a new series of direct mail pieces and newspaper ad mats is available.

*Industry's Yearly Multi-Million Dollar Corrosion Leak is Now Being Plugged By the Use of Magnesium Anodes!

Standard Cylindrical Magnesium Anodes not only offer the most advantageous design for maximum current efficiency but prior to fabrication, intensive metal analysis tests are made by the use of the Spectrograph to assure a finer quality anode for greater corrosion control.

Write today for our descriptive booklet on Standard Cylindrical Magnesium Anodes. There is no obligation.

Standard Magnesium Corporation
TULSA, OKLAHOMA

ployees were given $2 to $3 for leads resulting in sales.

Canvassing. Salesmen of both stores rang doorbells, using a plastic ice tea spoon as a "door opener" and then asking these questions: (1) What type of fuel is being used for cooking in your home? (2) What make of range is being used? (3) What is the age of your range? The information was recorded with the housewife's name and address and she was given an invitation to come to the store to receive her salt and pepper figurines.

May Appliance used four half-time salesmen on canvassing; they rang 429 doorbells and obtained 278 interviews. Pearsons assigned eight men to half-time duty on the campaign, and they rang 1546 doorbells in obtaining 1102 interviews. Follow-up calls were made. In addition, past customers were a target of personal and telephone calls; recent purchasers of ranges were offered merchandise gifts for supplying leads; special evening store hours were arranged; and marriage license listings were used in the search for prospects.

Sales incidental to the range demonstration surprised both test stores: A refrigerator, a TV set, an automatic washer, and an automatic toaster were credited by May Appliance to the campaign, and Pearsons said Operation Jambuster was directly responsible for the sale of two refrigerators, one washer, one ironer, and one bedroom suite.

Shipments Down from 1950 But Climbing Steadily

Shipments of gas ranges and water heaters continued their climb out of the early summer doldrums in October and, while still sharply off from the unusually high marks of October 1950, made the best comparative showings since last May.

Both appliances registered a 32.9% drop from the same month a year ago, but good percentage gains over the previous month were recorded. Volumewise, ranges enjoyed their best month since April (when shipment total of 225,000 was only 5.9% off the comparable month for the previous year), and water heaters had the best month since May, whose 167,400 figure was but 14.2% behind May of 1950.

Cumulatively, range shipments for the first 10 months were only 20.2% behind 1950's record, water heater shipments were only 14.4% off. In range movements to date, the 1951 score was 2,009,800 against last year's 2,518,200; for water heaters, it was 1,672,200 against 1,954,600. Units shipped during the month were, for ranges, 206,800 as against 308,000 for October 1950 and 182,800 for September 1951; for water heaters, 157,700 against 235,100 for October 1950 and 127,100 for September 1951.

Competitively (through September, as electric unit shipments are not available for October as yet), the gas appliance industry was making a stronger comeback than the competition, although it had farther to go to come back to "normal." Range ratios, which had deteriorated to a 1 to 1 figure in June, were back in September to 1.7 to 1, identical to 1950's full-year record. For water heaters, where the ratio had slipped as low as 1.8 to 1 in June and July, September was back up to 2.4 to 1.

THE NORMAC
BELL JOINT CLAMP

A SIMPLE SOLUTION for one of the GAS INDUSTRY'S *most trying problems*

Solves Your Joint Repair Problems • Quick • Easy • Permanent

Installed in small pavement openings. Available in all standard sizes from 3" to 12". A simple set of tools cleans the joint, installs the clamp . . . often in only a quarter of an hour. SAVES TIME. SAVES MONEY and the repair is permanent. Designed for all conditions particularly where pavement repair costs are prohibitive. Such small opening repairs are scarcely noticeable when pavement is replaced.

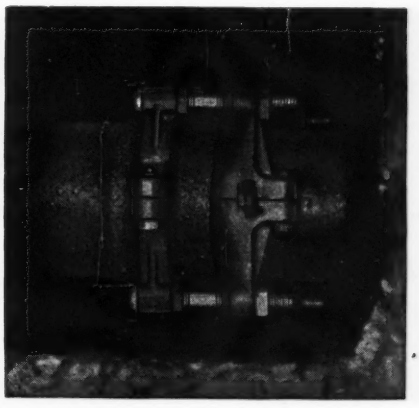
Normac Clamps can be installed in large as well as small openings.

Norton-McMurray hold definite leadership in the development of methods for installation and rehabilitation work through small openings. We welcome the opportunity to help solve a problem you may have—tell us about it.

Write for our catalog describing our complete line of

COUPLINGS . . . FITTINGS . . . SERVICE TEES and ELLS . . . SLEEVES . . . COMPRESSION-END COCKS . . . METER BARS and BRASS FITTINGS for copper pipe.

6 inch Normac Clamp being lowered into hole for installation



6 inch Normac Clamp in service after installation

NORTON-McMURRAY MFG. CO.

122 SOUTH MICHIGAN AVENUE • CHICAGO 3, ILLINOIS

Method and product covered by U. S. Patents, Nos. 2,163,261 and 2,178,286.

Electric Manufacturers In Big Appliance Promotion

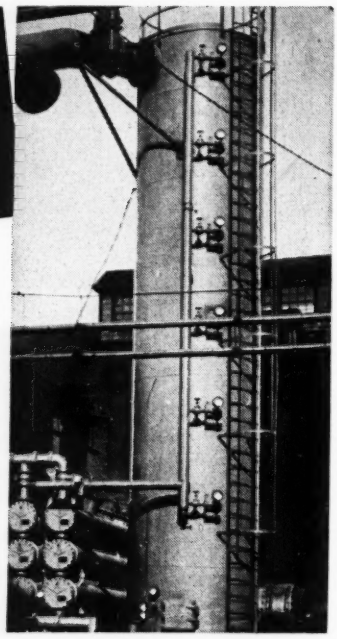
Led by Westinghouse Electric Corp., which is spending $8 million on advertising in the fourth quarter as against $4.5 million for the same quarter in 1950, the competition is in the middle of what *Wall Street Journal* terms the biggest "get-out-and-sell" effort in many years.

Bendix Home Appliances Inc., another of the big names in the electric industry (and in the gas dryer field as well), spent 40% more for promotion and advertising this fall than during the previous three months and 11% more than a year ago.

The flurry of selling activity is the manufacturers' answer to lagging consumer demand. Dealers still have heavy stocks on hand, and early 1951 scare buying drastically reduced the number of fall prospects for major appliances. A Federal Reserve Board report shows that department store stocks of major appliances—refrigerators, stoves, vacuum cleaners, and washing machines—at the end of August stood at 180% of the 1947-49 average; sales in August and September were 75% of that average.

Giveaways, contests, demonstration tricks, and drawings are all finding a place in the big national effort to reduce dealer inventories.

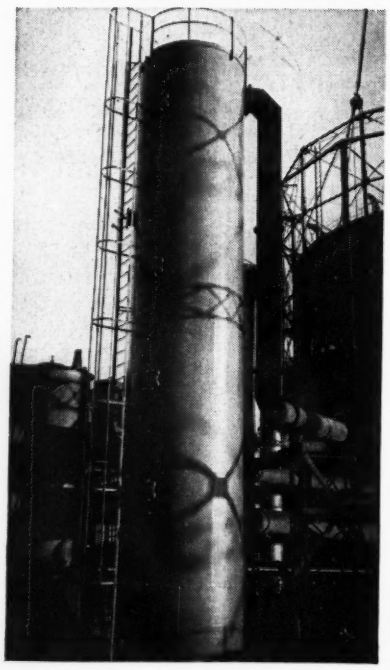
Gas Conditioning by Gasmaco



COOLING SCRUBBERS

The Spray-type Tray-less Scrubber has these features

- Best Heat Transfer Efficiency
- Minimum Pressure Loss
- Maximum Capacity
- Low First Cost
- Minimum Maintenance



OIL SCRUBBERS...

and auxiliaries for removal of light oil, naphthalene and gum formers . . . also complete light oil recovery systems . . . engineered and built by GASMACO

What are YOUR requirements?

THE GAS MACHINERY COMPANY

16108 WATERLOO ROAD
CLEVELAND 10, OHIO

Designers • Fabricators • Erectors
Gas Plant Equipment and Industrial Furnaces
THE GAS MACHINERY CO. (Canada) Ltd
HAMILTON, ONTARIO

A. O. Smith Again Sponsors Christmas Broadcast

A. O. Smith Corp., Milwaukee, has announced that it will again sponsor the traditional Christmas broadcast of "A Christmas Carol," featuring Lionel Barrymore as Ebenezer Scrooge.

Presented on behalf of its 10,000 dealers throughout the country, the program will be aired from coast to coast, as well as in Canada and Hawaii, on Dec. 23 over Mutual Broadcasting System. On the basis of listener rating surveys, it is estimated that it will be heard by more than 14 million persons.

A promotional package to exploit the broadcast locally is being supplied by A. O. Smith. Included are window streamers, newspaper ad mats, copy for radio spots, and special announcement post cards.

GE in Production on Heat Pump

Early in November, General Electric Co., Bloomfield, N. J., began commercial shipments of heat pump air conditioning units that the company claims will provide effective all-year pushbutton weather control in the home. GE plans to produce several hundred units in 3- and 5-hp sizes.

The heat pump is placed in the basement of a home, with pipes leading to the outside. Air is drawn in and heat absorbed from it through evaporation of a refrigerant gas—freon. When the refrigerant vapor is compressed, it releases heat to be circulated through ducts.

During summer cooling, the pump takes heat and moisture out of inside air and dissipates it outside. The process is reversed by turning a knob. Cost of operation is about the same as for other heating and cooling equipment, according to GE.

Financial

Rate Decreases Outnumber Increases During 1950

AGA's rate committee reports that the number of rate changes granted to gas utilities during 1950 totaled 111, as compared with 87 such changes the previous year. Of these, 59 were decreases amounting to a saving of $17.2 million for 3.4 million customers, while 52 were increases, totaling $15.6 million to be paid by 1.6 million consumers. It was the first time in four years that decreases exceeded increases.

Changeovers to natural gas were largely responsible for the trend, with 78 utilities distributing natural gas effecting reductions totaling $3.5 million and affecting 4 million customers. Manufactured and mixed gas companies reported 16 rate revisions, causing a net increase of $1.9 million to 218,000 customers.

Current happenings on the rate scene include the following:

A $132,000 annual reduction to customers of Madison (Wis.) Gas & Electric Co. was granted in an order issued by the state public service commission. The reduction, Madison's fourth since it changed to natural

Now you can get American Blower Gas-Fired Unit Heaters

We've been in the Unit Heater business a long, long time; in fact, we were one of the pioneers of modern, lightweight units 'way back in 1923.

Today, thousands and thousands of American Blower Unit Heaters for Steam and Hot Water Heating Systems are saving their owners money and doing a grand job of heating.

Now you can get this same dependable performance and economy with American Blower self-contained Gas-Fired Unit Heaters.

Tests prove these new A.G.A.-approved Gas-Fired Unit Heaters uphold the American Blower reputation for quality and efficiency in every respect.

New American Blower Unit Heaters are complete, compact, self-contained. They will operate with manufactured, mixed, natural, or liquefied petroleum gases. They're quiet in operation, easy to install, and dependable. They're pleasing in appearance, and built to last.

They are carried in stock, in sizes and capacities to meet most needs, and they're backed by our 69 years of experience in building the highest-quality air handling equipment.

You can put your confidence in American Blower Gas-Fired Unit Heaters or in American Blower Unit Heaters for Steam or Hot Water.

AMERICAN BLOWER CORPORATION, DETROIT 32, MICH.
Division of AMERICAN RADIATOR & Standard Sanitary CORPORATION

American Blower Gas-Fired Unit Heaters are available in 7 sizes with capacities ranging from 70,000 to 230,000 Btu/hr. input. Write for Bulletin 7117.

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UNIT HEATERS

Gas-Fired Models • Models for Steam or Hot Water

Serving home and industry AMERICAN-STANDARD • AMERICAN BLOWER
CHURCH SEATS • DETROIT LUBRICATOR • KEWANEE BOILERS • ROSS HEATER • TONAWANDA IRON

UC-1 Thermostat — "V-1" Valve

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4. *Few Parts and Easily Accessible*
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In over twenty years of building gas controls we have never offered a product which so rapidly gained national acceptance. For Water Heater Thermostats on which you can DEPEND, specify UTILITY.

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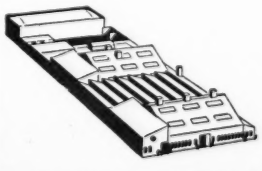

THE UTILITY CONTROL COMPANY FACTORY

Utility CONTROL COMPANY

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Early in November, U. S. Pipe & Foundry Co.'s new plant at Decoto, Calif. began operations, marking the first time cast iron pressure pipe has been cast centrifugally in metal molds on a production basis in the Pacific coast area.

Designed by the company's engineering department and built by Austin Co. on a 70-acre tract, the plant houses three centrifugal pipe casting machines, a pipe annealing oven, two core blowing machines, and a core oven. A chemical laboratory and a physical testing laboratory control pipe quality.

in mid-1950, is retroactive to October meter readings.

In compliance with an FPC order of Aug. 10, Hope Natural Gas Co., Clarksburg, W. Va., has refunded about $608,336 to five wholesale customers—East Ohio, New York State Natural, Peoples Natural, Manufacturers Light & Heat, and Mt. Morris Gas Co.

Three proposed changes have been suspended by the FPC. Commonwealth Natural Gas Corp., Richmond, Va., wanted to up wholesale rates by 9.7%, or $267,000. If the proceeding is not concluded by March 19, 1952, the increase will go into effect under FPC rules. United Gas Pipe Line Co., Shreveport, proposed rate supplements to four wholesale customers by invoking tax adjustment clauses to reflect production and gathering taxes in Texas and a gathering tax in Louisiana. Use of the new rate is deferred until next April 11, pending hearing and decision. Northeastern Gas Transmission Co., Springfield, Mass., must wait until April 1 to put into effect a $749,000 annual increase to wholesale customers. The company is delivering gas to New England at 45½ cents per Mcf and wants to raise it to 52½ cents.

Transcontinental Gas Pipe Line Corp., Houston, applied for a $13.6 million increase, sending the total of proposed rate increases pending before the FPC past the $100 million mark for the first time. Transco wanted to make its 26% rise effective Dec. 1.

An FPC presiding examiner has filed an initial decision requiring Atlantic Seaboard Corp. and Virginia Gas Transmission Corp., both of Charleston, W. Va., to file new rate schedules, replacing current ones which are "unjust, unreasonable, and unduly discriminatory."

After an extensive investigation, the commission has accepted for filing new schedules of El Paso Natural Gas Co., which increase the firm's rates by about $5.4 million per year. This is $4.3 million per year less than the increase applied for by the company. The new rates went into effect Nov. 1. Two suspension proceedings, involving total increases of $9,665,000 annually, have been concluded.

Over 60,000,000 ft.
in service!
Johns-Manville Transite* Flue Pipe has for nearly 20 years enjoyed a reputation for dependable, economical service in thousands of installations. Proof of its many practical advantages is shown by the fact that there are more than 60,000,000 feet of this asbestos-cement pipe in use!
For complete details, write for folder TR-84A. Address Johns-Manville, Box 290, New York 16, N. Y.
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Johns-Manville TRANSITE FLUE PIPE
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Three Mergers Reported; Jersey Central Sold

County Gas Co., Atlantic Highlands, N. J., which serves some 14,600 customers, has announced plans to take over the gas properties of Jersey Central Power & Light Co., Asbury Park, a firm which serves 73,000 consumers. Negotiations for the sale of Jersey Central had been in progress with several companies, following SEC's order directing General Public Utilities Corp., the parent, to dispose of its subsidiary's gas facilities.

Meeting the price, which is expected to be about $14.5 million, will probably require substantial public financing. On last Aug. 31, County Gas' total assets were $3,390,765. Its operating revenues reached $873,458. County Gas Co. has been in existence for some 30 years. Its system was converted from manufactured to natural in November 1949.

Plans for two other acquisitions were revealed last month. Equitable Gas Co., Pittsburgh, has been authorized to take over its subsidiary, Pittsburgh & West Virginia Gas Co. The latter firm is a producing and transmission company but also serves about 8000 natural gas customers. The other merger concerns Missouri Public Service Co.'s (Warrensburg) proposed acquisition of Missouri Gas & Electric Service Co., Lexington. The consolidated company, to be known as Missouri Public Service Co., would have total assets of about $24 million and would serve 76,500 customers in 142 towns.

Laclede Voices Objections To Supplier's Holdings

Laclede Gas Co., St. Louis, has submitted protests to the Securities & Exchange Commission and the Missouri Public Service Commission about the large and growing ownership of Laclede stock by its supplier, Mississippi River Fuel Corp. Although the company did not make a direct request for an investigation, the intent was implied.

As of Nov. 1, Laclede said, Mississippi River owned 248,400 shares, or 8.2% of the stock. Ownership of 10% of the stock would subject Mississippi to SEC control under the Public Utility Holding Company Act and also would require approval by the Missouri commission.

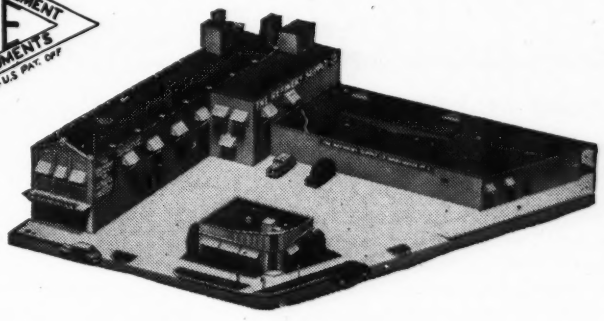
Laclede has expressed fear that the situation would interfere with proper arm's-length bargaining between the two concerns. The utility is opposing a 27% wholesale price increase being sought by its supplier from FPC and has said it will seek to pass any such increase on to its customers.

The next annual meeting for election of

An engineer from the province of Tyrol has been granted an Austrian patent on a device to be attached to gas or electric cookers to prevent liquids from boiling over.

The invention works on the principle that the overboiling liquid flows into a receptacle which, by its sudden increase in weight, operates an automatic cutoff switch, which stops the flow of gas or electricity.

AC-CURATE ME-ASUREMENT AC-ME PRECISION INSTRUMENTS TRADE MARK REG. U.S. PAT. OFF.



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Laclede directors will be held Jan. 24. It is believed that Mississippi might solicit proxies of independent stockholders in an attempt to elect a director to the board.

Revenues, Income, Sales Increased in July, August

Operating revenues and income of natural gas companies reporting to the Federal Power Commission showed increases for July and August of this year and for the 12-month periods ending with those months, as compared with the same periods last year.

July revenues were up 18.9%; August, up 17.2%. For the year, revenues showed gains of 23.8% and 23.2% as of July 31 and Aug. 31. Operating income: July, up 12%; 12 months, up 13.1%. August, up 3%; 12 months, up 11.2%.

Gas sales totaled 155,982 MMcf in July (16.4% gain over July 1950) and 160,817 MMcf in August (14% gain over the same month last year). Net income for both months showed a decline from the same months in 1950, although for the 12 months ended July 31 and Aug. 31, net income rose 6.8% and 3.7% over the previous year.

Record Utility Financing

Although 1950 capital financing by gas utilities set a new peak, the record has already been surpassed. AGA reports that figures for the first nine months of 1951 have exceeded last year's total.

For the nine-month period, new capital financing by straight gas utilities and pipeline companies aggregated $799 million, with $751 million being raised by natural gas companies. This represents a gain of $43 million or 5.7% for straight gas companies over the $756 million raised by these companies in the full year 1950. During the same periods, natural gas companies showed a 5.9% gain.

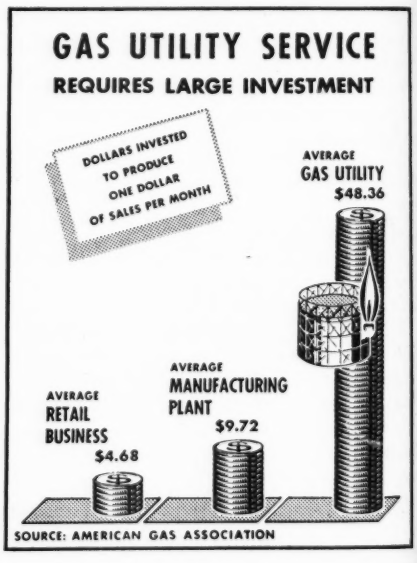
Financing activities of combination companies have been excluded.

Newsnotes

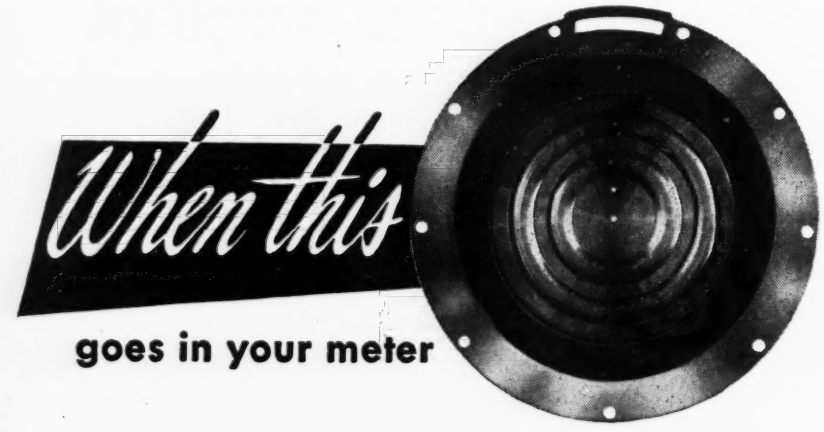
Two major companies have announced stock issues in order to complete their current construction programs. Tennessee Gas Transmission Co., Houston, soon will register an issue of $25 million of 20-year sinking fund debentures. In New York, directors of Columbia Gas System Inc. authorized the filing of a registration statement with SEC for the sale of 1,501,826 shares of common stock.

Pacific Lighting Corp., Los Angeles, which owns Southern California and Southern Counties Gas Co.'s, reports that its system total has now reached 1,599,104 meters. Number of active meters increased 104,294 during the past 12 months. Since World War II, more than 483,000 customers have been added.

Gas range prices, both at dealer and retailer level, were reduced by Perfection Stove Co., Cleveland, during its Oct. 20-Nov. 30 nationwide gas range sales campaign. Dealers were urged to participate by upping their newspaper advertising and by making full use of promotional material supplied by the factory during the six-week drive.


GAS UTILITY SERVICE
REQUIRES LARGE INVESTMENT
DOLLARS INVESTED TO PRODUCE ONE DOLLAR OF SALES PER MONTH
AVERAGE GAS UTILITY $48.36
AVERAGE MANUFACTURING PLANT $9.72
AVERAGE RETAIL BUSINESS $4.68
SOURCE: AMERICAN GAS ASSOCIATION

Substantially more money per dollar of sales is needed to supply gas service than most other commodities. The average gas company, for example, has $48.36 permanently invested in facilities required to provide a dollar's worth of gas to a customer each month. This large investment, which amounts to $44,500 for each gas company employee, is obtained from the accumulated savings of millions of Americans.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- 15, 20 or more years of continuous service from your Lancaster Metal Rim Diaphragms.
- Re-chrome leather, specially tanned for extra years of use in either wet or dry gases.
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Regulation

OPS Amendment Clarifies Ceiling Price Regulation 17

Certain provisions of Ceiling Price Regulation 17 (gasoline, napthas, fuel oils and liquefied petroleum products, natural gas, petroleum gas, casinghead gas, and refinery gas) have been clarified by OPS in Amendment 4, effective Oct. 27.

Special hydrocarbon fractions used in manufacturing synthetic rubber, aviation gasoline, benzene, toluene or xylene, or their components have been added to the list of products covered. Filing required under Section 28 is clarified as being a report of a ceiling price and not a request for approval. It therefore establishes the seller's ceiling price unless or until that ceiling is changed by OPS.

The amendment also establishes that a producer of natural gas, whose sales were made under a long-term contract entered into prior to July 1, 1951, may elect to establish ceiling prices in two ways. He may price either on the basis of the long-term contract or in line with the base period sales of his competitors.

Newsnotes

Resignations of Frank A. Watts as director of the materials division and of Charles E. Webber as director of the natural gas production and processing division of PAD have been announced by Oscar L. Chapman. Richard M. Morrison and R. P. Walsh, who have been serving as assistants in the respective divisions, will take over as directors.

DPAdministrator Manly Fleischmann has announced the appointment of William C. Truppner as assistant administrator in charge of production and distribution controls. Mr. Truppner has been acting as NPA assistant administrator for production controls since Oct. 1 and will continue in that position.

Osgood V. Tracy, on leave as general manager of Esso Standard Oil Co.'s chemical products department, has been appointed deputy director of the chemical division, National Production Authority. He will work with Kenneth H. Klipstein, director of the division.

PAD has granted Manufacturers Light & Heat Co., Pittsburgh, a priority to obtain 15,400 tons of steel pipe during the fourth quarter of 1951.

Miscellany

Construction Dollar Volume Decline Predicted for '52

Construction dollar volume in 37 eastern states will probably run 10% less in 1952 than in 1951, F. W. Dodge Corp., construction news and marketing specialists, predicted last month. The estimate was prepared by Thomas S. Holden, Dodge president.

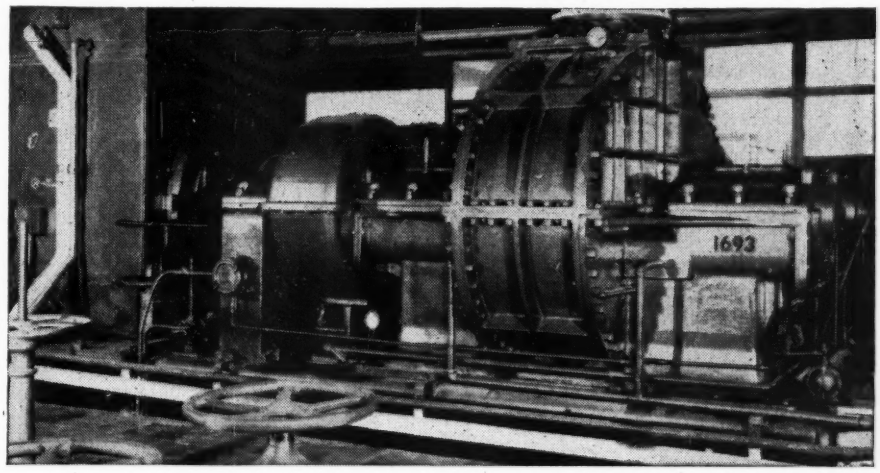
Construction projects which were refused allotments of critical metals in the fourth quarter of 1951 were deferred, not aban-

NEW R·C EXHAUSTER
pays its own way

By replacing a 30-year-old battery of three steam-driven gas exhausters with a new, high-capacity, electrically-driven R-C unit, important advantages were gained, in a large industrial plant:

1. **The one new unit carries the base load.**
2. **Steam needed for 5 other steam-driven exhausters, carrying partial load, is substantially reduced because of slower speeds.**
3. **Heat balance in the plant is maintained.**
4. **Savings in total power cost will pay for the new installation in about one year.**

These very satisfactory results were obtained by careful evaluation of all the factors before deciding upon the type of equipment . . . and then by specifying an R-C Rotary Positive Gas Exhauster that will do the work at low operating cost.



Type RCGH Rotary Positive Gas Exhauster, driven by 450 hp synchronous motor. Capacity, 20,600 cfm.

Even though your equipment to handle gas or air may still have years of life, it may be sound economy to replace it with modern, efficient, R-C units of the right type, size and drives to best meet your needs. Our engineers will help you analyze your problem and make unbiased recommendations of either Rotary Positive or Centrifugal equipment, depending upon your specific conditions. This *dual choice* is an exclusive R-C advantage.

With capacities from 5 cfm to 100,000 cfm, R-C units can be closely matched to work requirements, for dependable, economical performance. At Roots-Connersville, almost a century of blower building experience is at your service, without obligation.

Single-stage, Type OIB Gas Exhauster in gas utility plant. Capacity 39,950 cfm.

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ROOTS-CONNERSVILLE
BLOWER BUILDERS R-C SINCE 1854
ONE OF THE DRESSER INDUSTRIES

doned, the report points out. These requirements can be reconsidered and granted in later quarters. Consequently, these projects represent a portion of construction demand that will carry over into next year. The study cites population growth and other expansion factors which cause construction demand to accumulate during metal shortages.

Residential building will decline more than any other classification, according to the Dodge outlook, while public works and utilities will decline the least. Expected dollar volume declines, percentagewise, are: Nonresidential, 6%; residential, 16%; and public and private works and utilities, 4%. Each classification shows an expected decline except privately owned utilities, scheduled for a 31% gain.

Southern California Gas Southwest Division Set Up

To keep pace with the growth of Inglewood, Hawthorne, Torrance, and other beach cities in its territory, Southern California Gas Co., Los Angeles, has established a new "southwest division" with headquarters in Inglewood. The unit went into operation Nov. 1.

A two-story, 20,000-sq ft concrete and brick building will be constructed in the near future. It will be used for operating and accounting functions and will not contain any consumer facilities. Completion is scheduled for early 1953.

The new division includes about 95,000 customers. Since 1940 the number of meters in incorporated cities in the area has increased 86%.

Lester E. Green, former SoCal district manager in Hollywood, has been appointed southwest division manager, with W. G. H. Russell as commercial manager. Other personnel includes H. H. Pottle, sales supervisor; C. H. Ray, superintendent of distribution; L. E. Henry, service supervisor; W. G. Cox, engineer; and P. D. Kelly, accountant.

OUCH!

"When an automobile owner switches from a convention-drive car to Merc-O-Matic drive he is often in the same position as a housewife who switches from a match-lit gas stove to a modern electric range."

—Lincoln-Mercury Times November-December 1951

Northern Natural Ordered To Serve Metropolitan

Northern Natural Gas Co., Omaha, has been ordered by FPC to provide natural gas service to Metropolitan Utilities District of Omaha for resale to industrial customers in the city on the same basis of classification for curtailment purposes as was in effect when Northern served these customers directly.

In addition, Northern was directed to maintain the established interconnection of its facilities with MUD's facilities and to deliver natural for resale to the Omaha Public Power District. The commission also approved the abandonment by Northern for sale to Metropolitan of pipeline facilities used to serve six industrial customers in south Omaha.

The proceedings were instituted by FPC in May 1950 following the filing of two complaints by Metropolitan against Northern.

Oak Cliff Service Center Started by Lone Star

Lone Star Gas Co., Dallas, has announced the beginning of construction on a four-building, $550,000 service center in the Oak Cliff area. The project is expected to take about a year.

A 54,000-sq ft warehouse for supplies, equipment, and appliances, as well as office space, is to be the principal building. It will have a 300-ft dock for loading, storing, and servicing automotive equipment. Workmen in the company's street department will be provided with a new 2300-sq ft structure which will serve as a waiting room.

Two other buildings will be used for pipe storage and handling, gravel bins, storage space for heavy duty construction equipment, automotive equipment servicing, and a work shop.

Posthumous Award Given

In recognition of his contributions to industrial intelligence during World War II, the Dept. of the Navy recently presented a posthumous award to Bernard V. Pfeiffer,

THE TOUGHER THE JOB
THE MORE WE CAN HELP

An outside viewpoint is often essential in a search for new ways of cost reduction, methods, management, organizational, or engineering problems.

Commonwealth specialists have a sound background in the various aspects of business operations. Valuable time of your executives may be saved by calling Commonwealth in on the job.

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who died several years ago. Mrs. Pfeiffer accepted the Certificate of Appreciation during a special ceremony at Franklin Institute in Philadelphia.

Near the end of the war the Technical Industrial Intelligence Committee, which worked closely with the Joint Chiefs of Staff, sent Mr. Pfeiffer to Germany to study production methods and industrial development in that country. He was formerly manager of gas operations for United Gas Improvement Co., Philadelphia, and was an executive of the American Gas Assn. at the time of his death.

Peoples Ups Heat Content

Now that Texas Illinois Natural Gas Pipeline Co.'s line from Texas is substantially completed, Peoples Gas Light & Coke Co., Chicago, is making plans to increase the natural gas content of its gas to 90%. The Illinois Commerce Commission approved the firm's petition last month.

Since February, under an interim order, Peoples has adjusted the appliances of more than 300,000 of the firm's 940,000 general customers. The company hopes to put the new service in operation by next June 1. No rate change is anticipated because of the change from 80% natural.

Newsnotes

Five subsidiaries of United States Steel have announced increases in prices of galvanized sheets, pipe, and certain wire and wire products, reflecting a 2-cent/lb rise in the price of zinc approved by OPS on Oct. 2. The change was in accordance with published standard formulas by which prices of zinc-coated products are automatically revised when zinc prices change. The firms involved are U. S. Steel Co., American Steel & Wire Co., Columbia Steel Co., National Tube Co., and Tennessee Coal Iron & Railroad Co.

Following a series of gas explosions in Pittsburgh's Beltzhoover area in late October, scores of employees of Equitable Gas Co. and Manufacturers Light & Heat Co. immediately set to work checking mains of both companies. They were found intact. The blast which killed one person and injured 33 others was blamed on a leak in a 2-in. feeder main.

A standby propane unit to supplement the natural gas supply at Westinghouse Electric Corp.'s Irwin, Pa. works is to be built by the chemical plants division of Blaw-Knox Co., Pittsburgh. In addition to designing the unit, Blaw-Knox will procure materials and equipment and handle the construction.

Philadelphia Electric Co. recently received the AGA accident prevention award in recognition of a 25% or more improvement in safety performance as compared with the previous year. Roy M. Godwin, safety manager, accepted the award on behalf of the company.

Lawrence Litchfield Jr., vice president of Alcoa Mining Co., recently stated that 52% of the planned expansion of the aluminum industry, amounting to 310,000 tons, will use natural gas instead of water power. About 85,000 tons will be produced by lignite.

CURRENT READING

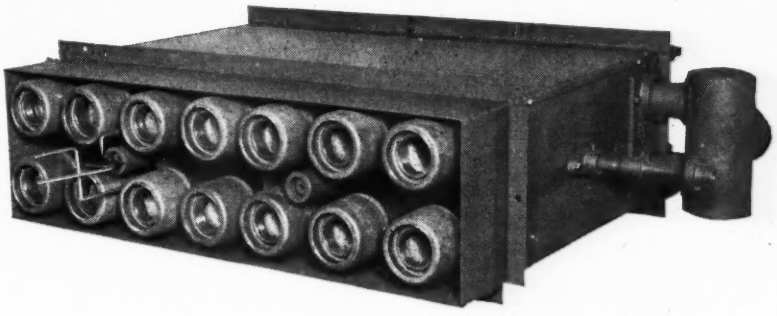
CUFF NOTES ON TELEVISION — Published by the AGA home service committee to report some home service department accomplishments during two years of TV experience. Vivian Marshall, New Orleans Public Service Inc., is 1951 chairman of the committee, and Jessie McQueen, AGA home service counsellor, is editor of the booklet. Copies are available from the association for 15 cents each.

The pamphlet opens with a brief explanation of why gas companies have television shows. Utilities considering the use of TV will find a fund of valuable information on methods of organizing a show, program ideas, measuring results, production suggestions, and techniques.

A series of case studies covers almost every type of program that can be used to sell gas and gas appliances. Briefly, they include the following:

1. *Daily one-hour show.* A work plan for this show follows a rotating pattern—complete meal, one food used various ways, seasonal dishes, quickie recipes, parties. Each program is planned to use the three cooking zones—top burner, oven, and broiler—as well as the gas refrigerator and automatic water heater. By planning four weeks in advance, the home economists have time to study the why and how of preparation, history of dishes and foods, and other items

WEBSTER KINETIC* BURNER



FOR LOW PRESSURE GAS

Scotch Marine type boilers, air heaters and any other type of "cold" furnace can be fired by natural gas at higher ratings.

The Webster Kinetic Burner is easy to install, compact and economical to operate.

It fires with extremely low pressure gas without noise, vibration or electric power and with minimum furnace draft.

The Webster Kinetic consists of a multiplicity of full venturi mixers with flame retention nozzles. These are assembled in a metal casing complete with pilot and louvre. It may be used with natural, mixed or liquefied petroleum gases. Standby oil burners may be used when desired.

As a multiple head assembly it is available in 25 standard sizes of from 4 heads to 48 heads, and can be supplied in any size or shape. Natural gas input ratings from 560,000 Btu/hr to 6,720,000 Btu/hr at 4" wc. For complete information request Series B8 Bulletins.

*TRADEMARK

The WEBSTER ENGINEERING COMPANY
TULSA, OKLAHOMA
Division of SURFACE COMBUSTION CORPORATION, Toledo, Ohio

to add interest and variety to the program.

2. *Daily half-hour show.* These programs are presented over stations in two cities served by one company. The "telegas" kitchens used in both studios are owned by the gas company and have been installed at the request of the local stations. Sponsorships came along quickly and appliance dealers and manufacturers have been cooperative.

3. *Semi-weekly demonstration.* In a two-hour studio-sustaining program a 30-min. cooking demonstration is presented on Tuesdays and Thursdays by a home service department. A New Freedom Gas Kitchen was installed in the studio, and commercials are handled by the master of ceremonies. Since other firms give demonstrations on this program, long-range planning is impossible because of the risk of repetition. Special attention is given to timely subject matter and cookery techniques. Government market tips are reported in an effort to tie in good food buys.

4. *Joint sponsorship of half-hour show.* The gas company is one of several sponsors for a homemakers' show presented by the TV station's home economist. Other sponsors are food and utensil companies. The utility pays for eight commercials a week which are woven into the demonstration. The home economist uses an all-gas kitchen and during her presentation refers to the advantages of gas for cooking and refrigeration. CP ranges are used, each for a period of two weeks.

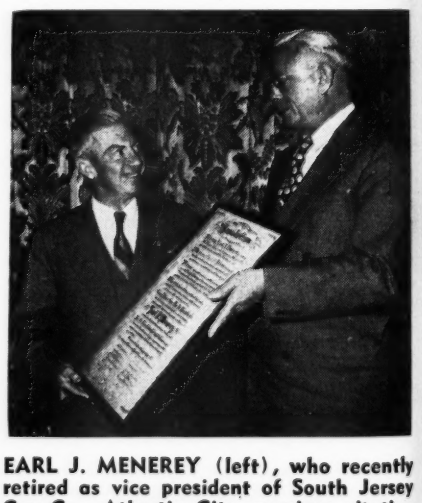
5. *Weekly single-menu show.* One complete meal is prepared for this program, with as much as possible of the actual preparation being done during the half-hour show. Where it cannot all be done during the allotted time, the most interesting, photogenic, or educational phases are chosen. For the closing shot, the complete meal is always shown.

VALVES USED IN INDUSTRIAL PLANT GAS PIPING—Issued by AGA's industrial gas practices committee as Information Letter No. 42, this bulletin describes the various classes of gas valves in use in industrial plants and lists the manufacturers. The letter was intended to furnish information which will assist in securing valves which are not well known, and no effort has been made to list manufacturers of valves which are stock items with regular suppliers. The lists are not to be considered as complete or as the recommendation of a particular manufacturer.

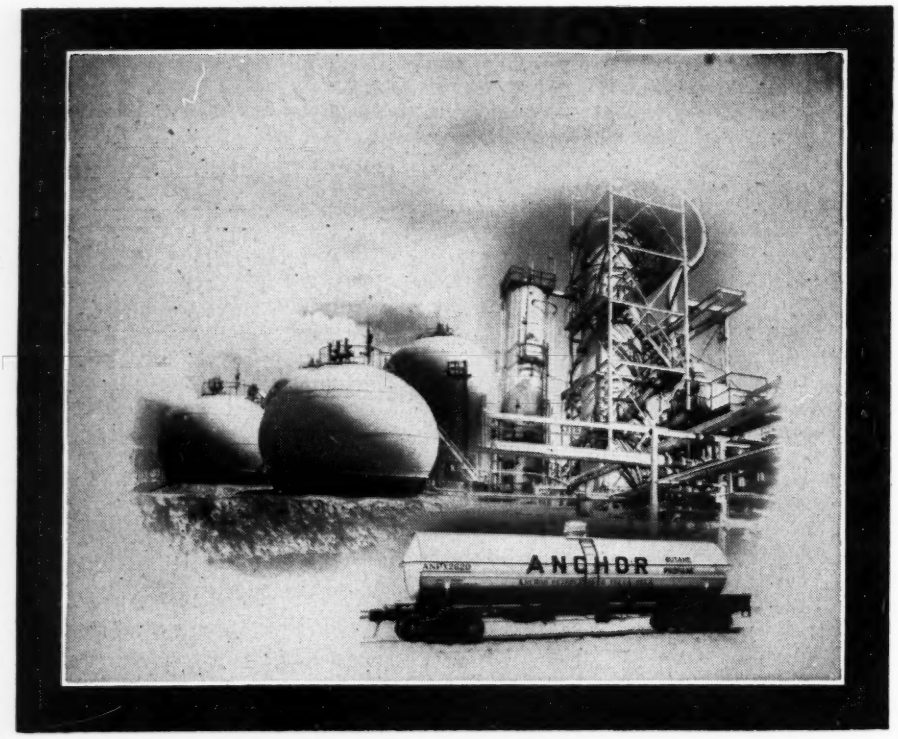
PEOPLE

DR. WALTHER MATHESIUS has announced his retirement as president of Geneva Steel Co., Salt Lake City, to become consultant for the Freyn Engineering Department of Koppers Co. Inc., Pittsburgh, with headquarters at the company's Chicago office. Vice president in charge of operations for U. S. Steel Corp. of Delaware in 1937, Dr. Mathesius was chiefly responsible for the decision of U. S. Steel to engage in steel operations on the west coast, and when Geneva Steel was formed in 1943, he was elected president and a director.

Two recent promotions in the research department at American Radiator & Standard Sanitary Corp., Pittsburgh, include the appointment of FRANK E. HANSON as products engineer, supervising field research in the development of new products, and JOHN B. UHL, succeeding Mr. Hanson as chief engineer of the gas department, supervising the development of all gas-fired products. Both men will headquarter at the company's new research laboratories nearing completion at Louisville, Ky.



EARL J. MENEREY (left), who recently retired as vice president of South Jersey Gas Co., Atlantic City, receives citation from Earl Smith, president. Passed and signed by the board of directors, the resolution cites Mr. Menerey's unfailing service to the industry.



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From our strategically-located plants we are able to give quick delivery on high-quality ANCHORGAS, Butane-Propane. Shipments by rail, water, or transport. For dependable gas service, call us before you renew your contract. Ask about Anchor's contract plan.

ANCHOR PETROLEUM COMPANY

Atlas Life Bldg. Tulsa, Oklahoma

Donald Moore
... Tractor Sales

H. W. Milner
... Bryant

Tractor Sales Corp., Los Angeles, recently announced the appointment of DONALD MOORE as national sales representative for the Everett trencher, McGee scraper, and angle dozer. Before joining Tractor Sales, Mr. Wood was assistant sales manager of the Skyline Corp., Wichita, Kan.

Bryant Heater Division, Affiliated Gas Equipment Inc., Cleveland, has appointed H. W. (TEX) MILNER to the post of manager, special accounts division. Mr. Milner, long associated with the gas industry, previously served with government administrative agencies during World War II, as vice president in charge of sales, Heating Research Corp., and sales manager, Domestic Heating Division, Stewart Warner Corp.

In early October, Dearborn Chemical Co., Chicago, announced the addition of ROBERT G. GERSTMYER to its sales staff. At about the same time, GEORGE RUSSELL CARR, chairman of the board, was honored at the annual 25 Year Club dinner for the completion of a half century of continuous service with the company.

Several sales appointments for the Day & Night division of Affiliated Gas Equipment Inc., Cleveland, include FRANK SPRATT as southern California sales manager, JIM BUSTER as sales representative in the Midwest with headquarters in Tulsa, and JOHN LYONS to represent the company in the Pacific northwest.

H. C. MEFFORD SR., who recently resigned as president and general manager of the United Fuel Gas Co., Charleston, W. Va., has been succeeded by E. D. BIVENS. Mr. Mefford started with the Charleston Group of the Columbia Gas System in 1912 as a workman in the gas fields, was elected vice president of United Fuel in 1946, and became vice president and general manager of all Charleston Group companies in 1950. Mr. Bivens entered the gas industry in 1929 as assistant treasurer of Ohio Fuel Gas Co., Columbus, and from 1932 to 1939 served as treasurer and director. He also served as treasurer, director, and accounting officer of Columbia Engineering Corp. in New York and was named treasurer of the Columbia Gas System in 1947. In 1951 Mr. Bivens became vice president and assistant general manager of United Fuel and associated companies in the Charleston Group.

E. D. Bivens

Several recent changes announced by Rheem Manufacturing Co., New York, include the appointments of WILLIAM S. RHEEM, with the company since 1938, as manager of the South Gate, Calif. plant; LLOYD SIMONSON, former manager of the South Gate plant, to take over as manager at Sparrows Point, Md.; and HARRY H. FILLER, who established the Singapore and Buenos Aires plants, to manage the plants in Bayonne and Linden, N. J.

At a recent board of directors meeting of Petersburg (Va.) & Hopewell Gas Co., FRANCIS K. GODWIN was elected president, succeeding W. H. JAMES as president and JOHN H. WINN as general manager. Mr. James recently retired but will remain as a member of the board of directors, while Mr. Winn resigned to take another position. Mr. Godwin, associated with gas and electric utilities in Oklahoma, Colorado, and Ohio, served as president of the East Coast Electric Co., West Point, Va. until its merger with Virginia Gas & Electric Power Co., Richmond, at which time he served as director of residential sales and promotional advertising for Virginia Gas.

J. THEODORE WOLFE, executive vice president of Consolidated Gas Electric Light & Power Co., Baltimore, was elected a director of Davison Chemical Corp. recently after stockholder authorization of an increase in the number of directors from 11 to 15.

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For Defense Production and Essential Civilian Requirements

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Whenever brass or bronze metal is specified you are assured quick cooperation and prompt production. Where close tolerances are demanded, where familiarity with government specifications is desirable, call in Detroit Brass—get the advantages of the company's fifty years' growth in brass experience.

Producers and Suppliers of materiel for: U. S. Army Ordnance • U. S. Navy • U. S. Army Air Corps • Maritime Commission and the following industries: Air Conditioning • Aircraft • Automotive • Beverage • Diesel Engine • Dry Cleaning • Farm Equipment • Gas Appliances • Locomotive • Oil Refining Equipment • Oil Heating Equipment • Plumbing • Refrigeration • Rubber • Spray Equipment • Washing Machine • and others.

DETROIT BRASS & MALLEABLE WORKS
SPECIALTIES DIVISION
DETROIT 9, MICHIGAN

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681 Market St., San Francisco, Calif.
Please send, without obligation to me, the HYDRAUGER BOOKLET which shows relative costs and speeds of BORING as well as specifications of various Hydrauger models.

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AVOIDS EXCESSIVE TRENCHING

Hydrauger bored holes for pipe installation invariably reduce costs 80% to 90% by eliminating trenching and back-filling to say nothing of man-hour labor savings and safety to highway traffic.

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*Earth Boring Tool

Wrong !
ADJUSTMENT

¶ Just when you're taking a nice warm shower, someone decides to water the lawn or fill the laundry tubs—then your hot and cold water adjustment is upset because of *pressure* change!

¶ The same principle applies to Gas Pressures—*changes* in pressure will affect the proper mixing of gas and air necessary for optimum operation of gas burning units.

¶ Maxitrol Gas Regulators automatically adjust and control Gas Pressures 24 hours a day—every day!

¶ If you have problems in Pressure Regulation please call on our Engineering Department to help you.

DETROIT GAS REGULATOR CO.
1742 RIVARD ST. DETROIT 7, MICH.

W. B. Cooper
. . . Amer.-Standard

R. L. Farmer
. . . Gen. Controls

WILLIAM B. COOPER has been appointed to the newly created position of sales manager of engineered products for American Radiator & Standard Sanitary Corp., Pittsburgh. Mr. Cooper, a member of the American Society of Heating and Ventilating Engineers and the American Society of Refrigerating Engineers will handle the sale of air conditioning cooling, and specialized heating equipment.

General Controls Co., Glendale, recently appointed ROBERT L. FARMER, an employee of the company since its beginning, as factory sales engineer. At the same time, FELIX WENGERTER was named to the position of district manager of the New York branch office with complete charge of sales, engineering, and service in the Newark and New York territories.

M. B. MCALLISTER and M. F. MCDANAL, both with a background of many years' experience in meter repair, recently established the Birmingham Gas Meter Repair Service, Ensley, Ala. Mr. McAllister, elected president of the company, began his career servicing meters in 1923 with a local Birmingham utility and Mr. McDanal, elected secretary and treasurer, has been engaged in meter repair work since 1933.

San Diego Gas & Electric Co. has named EMERY D. SHERWIN to the office of president, succeeding A. E. HOLLOWAY, who recently resigned after 41 years of service. At the same time HAROLD A. NOBLE, former general superintendent, was elected vice president in charge of operation, succeeding Mr. Sherwin. Associated with San Diego Gas since 1915, Mr. Sherwin served in many capacities including assistant general and general superintendent, has been a member of the board of directors since 1944, and was recently elected president of the Pacific Coast Electrical Assn. Mr. Noble, a company employee since 1925, formerly served as construction engineer, assistant superintendent, and superintendent of electric production.

E. D. Sherwin

A. E. Holloway

J. L. Kiraly
... Amer. Meter

Eugene H. Wood
... Memphis Light

Newly appointed assistant to the vice president in charge of production for American Meter Co., New York, is JOSEPH L. KIRALY. Prior to his association with American Meter, Mr. Kiraly served with Stevenson, Jordan & Harrison, management consultants, for nine years as an industrial engineer.

EUGENE H. WOOD has been promoted to the position of chief engineer of the gas division, Memphis (Tenn.) Light, Gas & Water Division, replacing H. G. HOWELL, recently resigned. Employed by the company in 1936 as a design engineer, Mr. Wood previously served as assistant superintendent of operations and until his recent promotion, as assistant chief engineer.

Associated with Master Tank & Welding, Dallas, since its beginning, TOM HALEY has been promoted to the position of sales manager. Prior to his association with the company, Mr. Haley was sales manager of Master Petroleum Co. Simultaneously, C. A. MCGEE was promoted to the position of office manager.

WILLIAM B. BLACK, chief industrial sales engineer of United Natural Gas Co., Oil City, Pa. recently resigned to accept a position with Fairmont (W.Va.) Wall Plaster Co. JAMES M. ELLIOTT, formerly an assistant engineer in the mechanical engineering department, was named as Mr. Black's successor.

New manager of residential and commercial sales for the Binghamton division of New York State Electric & Gas Corp. is DANIEL J. O'NEILL. Mr. O'Neill was formerly local representative at Johnson City.

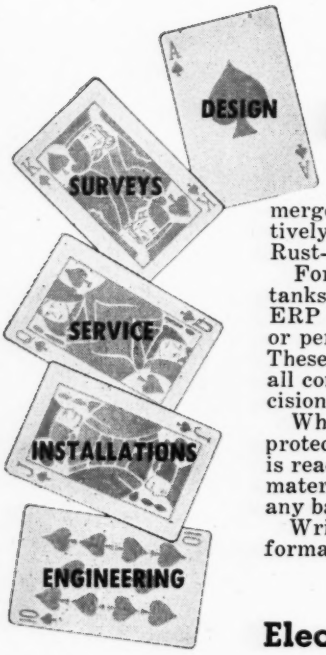
Two new field representatives appointed by Hays Manufacturing Co., Erie, Pa. include LEON R. BUTLER, to cover Louisiana, Mississippi, and Tennessee, and BYRON L. ANDERSON, as representative in Illinois. Mr. Butler, replacing GUY ASHWORTH, who recently resigned, is a graduate of Louisiana Polytechnic and Mr. Anderson is a Purdue University graduate.

B. L. Anderson

L. R. Butler

Gas FIRED
Peerless HEATING EQUIPMENT
THE COMPLETE LINE FOR ALL Gas NEEDS
Forced Air and Gravity Circulators, Radiant Heaters, Panel Heaters and Fan Type Unit Heaters. 48 Years of progressive advancement has developed this complete, tried and proved line—styles, types and sizes for domestic, commercial or defense heating requirements.
A.G.A. Approved
Stylewise, Qualitywise and Pricewise The PEERLESS Line Is Best for Every Heating Requirement — For Small Homes, Apartments, Housing Projects, Defense Housing, Churches, Schools, Motor Courts, Stores, Offices, Shops.
Write for literature and prices today.
YEAR 'ROUND DISPLAYS
PEERLESS MANUFACTURING CORP., LOUISVILLE 10, KENTUCKY

The TROJAN pipe puller and pusher
Cuts costs, Saves time!
Simplifies installation or renewing of gas service lines under pavement
You get double action and continuous operation with a Trojan Model B Pipe Puller and Pusher. It's more than twice as fast . . . doesn't require any resetting of the grip . . . and pushes or pulls up to 2" pipe without additional dogs, clamps, or wedges.
The Model B has three pushing speeds for different types of soil and can be reversed in 30 seconds. It is constructed entirely of steel and weighs 140 lbs. Each part is heavy enough to withstand the most severe treatment.
Heavy steel push pipe comes in 30 inch lengths . . . has all inside couplings, insures straighter travel, and requires a trench only 5½ feet long to operate the pusher. Joints are faced on ends to assure perfect alignment when screwed together.
Pilots and couplings are made large enough to pull covered iron pipe without destroying the covering.
Write today for full details.
The TROJAN Manufacturing Co., 1112 Race Drive
41 Greenway, Hamden, Conn. • Box 465, Memphis, Tenn. Troy, Ohio



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Corrosion losses affecting buried and submerged structures can be stopped quickly and effectively when you play the cards provided by Electro Rust-Proofing cathodic protection service.

For pipe lines, tank bottoms, buried cables, water tanks, off-shore drilling platforms, condensers, etc., ERP engineering services are available on a contract or per diem basis as required by each individual job. These services include surveys, design and engineering all conducted by capable field engineers utilizing precision testing instruments.

Where the engineering work indicates that cathodic protection is necessary, the ERP Contract Department is ready to take over the furnishing of equipment and materials, installation and maintenance on practically any basis suited to the needs of the job.

Write today, without obligation, for additional information and technical publications.

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CATHODIC PROTECTION FOR ALL BURIED AND SUBMERGED STRUCTURES

"I'll always be glad I decided to Sell the ENTERPRISE Line"
"My luckiest day was the one when I saw a dealer friend's ENTERPRISE Display. I liked the way the ranges looked; and when I found out they were built by a firm with 93 years of expert craftsmanship and unquestioned integrity to back up the line, I wrote for details on a dealership. I've been making money ever since so you can see why I like the Enterprise Line."
You, too, can make money handling and selling the ENTERPRISE line. Write for catalog information on the 15 beautiful models for all types of GAS.
Established 1858
Enterprise
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MANUFACTURING COMPANY
NASHVILLE, TENN. • ESTABLISHED 1858

Recent additions to the sales staff of Tappan Stove Co., Mansfield, Ohio, include the appointment of JACK BLAND to cover southwest Texas, R. J. ROWLANDS for Missouri, J. W. PHILLIPS and R. R. MYERS as Cleveland representatives, D. D. CARLSON in northern California, L. A. CARDUCCI as New York, New Jersey, and Connecticut representative, and S. A. HANNER to cover Texas and Louisiana.

After 14 years in various capacities with Houston Natural Gas System, J. FORTUNE AMBERG recently resigned as general manager. Mr. Amberg joined the system as a district auditor and later served as dealer coordinator, office manager, and head of residential and commercial sales.

J. F. Amberg
... Houston

J. T. McNally
... ACF

JOSEPH T. MCNALLY has been appointed sales agent in the New York district sales office of the American Car & Foundry Co., N. Y. Mr. McNally, specializing in tank car and miscellaneous sales, since 1946 has been assistant manager of tank car sales. He was previously associated with Shippers' Car Line Corp. and American Welding Co., an ACF subsidiary.

To better serve an expanding market, Detroit Brass & Malleable Works has added four representatives to its sales staff. JOHN WILCOX JR., with headquarters in Chicago, will cover Iowa, Minnesota, and Wisconsin; THOMAS STEVENS has been appointed to the territory of Ohio, Indiana, Kentucky, and Tennessee; FRED BLACKWOOD will represent the company in West Virginia, western Pennsylvania, western New York, and the Cleveland area; and LAWRENCE BERMAN will handle the state of Michigan.

The appointment of L. C. ROBERTS to succeed the late J. M. FLOYD as advertising director has been announced by Lone Star Gas Co., Dallas. Mr. Roberts, with the Lone Star advertising department for 18 years and advertising supervisor since 1942, recently accepted an appointment to the advertising committee of the American Gas Assn.

HARRY L. STEARNS, Chicago district sales manager of Servel Inc., Evansville, Ind., for nine years, and a member of Servel's sales staff for 24 years, is now Detroit sales manager for the company. His new territory will include the Michigan and Toledo, Ohio trading area.

E. ROWLAND ENGLISH has joined Pipe Protection Service, Elizabeth, N. J., as assistant general manager in charge of sales. Mr. English, formerly associated with H. C. Price Co., Bartlesville, Okla., is an active officer of the National Assn. of Corrosion Engineers.

W. B. Tippy

Commonwealth Services Inc., New York management and engineering consulting firm, has announced the incorporation of a subsidiary, Commonwealth Gas Conversions Inc., with WILLIAM B. TIPPY, vice president and director of the parent company, as president, CLETUS B. FARRELL as general manager, and HOWARD E. WALLIS as chief field engineer. The new subsidiary will serve operating gas utilities in converting present gas appliances for the use of natural or high-Btu manufactured gas, taking over all field conversion services previously rendered by Gas Construction & Service Co., by agreement with the latter company.

SAMUEL H. CROSBY, Washington (D.C.) attorney, last month was named a hearing commissioner for the National Production Authority, U. S. Dept. of Commerce. He will preside at public inquiries into charges of violations of NPA orders and regulations. Mr. Crosby was admitted to the bar in Iowa and practiced, from 1908 to 1938, in Grinnell, Iowa; Denver, Grinnell, Texas; and White River Junction, Vt. He was Vermont state administrator for the Federal Works Agency in 1938-39. Mr. Crosby became a trial examiner for the Federal Power Commission in 1939 and five years later joined E. Holley Poe & Associates, New York, as Washington counselor. He was with the firm until 1949. In recent years, Mr. Crosby has contributed frequent articles to *GAS* and other publications.

B. E. CLAFFEY has been named appliance supervisor by Southern California Gas Co., Los Angeles. Mr. Claffey will assume new duties in purchases and stores and will direct the appliance installations as well as the appliance parts section.

Alabama Gas Corp., Birmingham, has announced the appointment of CHARLES B. GAMBLE JR. as chief engineer. He has been associated with the company for many years.

Obituaries

WALTER L. CHEWNING, gas consultant for Day & Zimmermann Inc., died recently at the age of 70. Mr. Chewning, a well known gas engineer, retired from active duty with Day & Zimmermann about five years ago. His gas industry career began as a cadet engineer with Public Service Gas Co., Newark, where he advanced to superintendent of the Front street works. In 1910 he became engineer of Consumers Gas Co., Reading, Pa., and a year later joined the United Gas Improvement Co. as assistant to the chief engineer of construction, whom he later succeeded. Eventually, Mr. Chewning became vice president of UGI Contracting Co. and continued with United Engineers & Constructors Inc. He joined Day & Zimmermann in 1938.

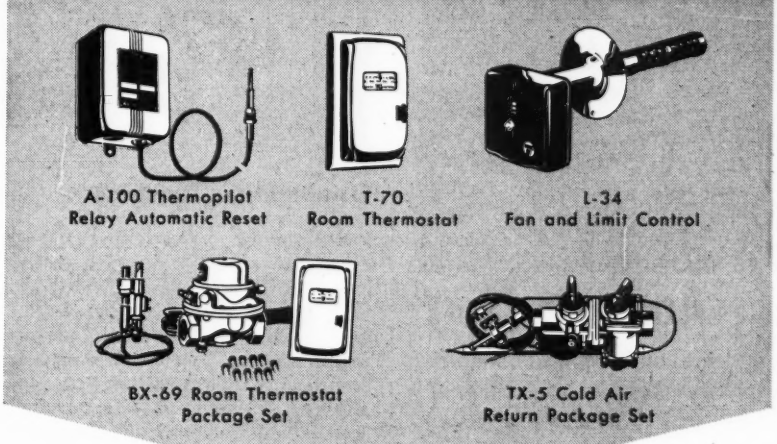
HIRAM G. CORNATZAR, former treasurer of Lone Star Gas Co., Dallas, died recently in El Cajon, Calif. at the age of 66.

WILLIAM P. GENOVAR JR., 54-year-old valuation engineeer for the New York Public Service Commission, died Nov. 4. after a short illness. Mr. Genovar began his career as a cadet engineer for Public Service Electric & Gas Co., Newark. He served gas companies in Brooklyn, Syracuse, Havana, Panama, Poughkeepsie, and Albany. and joined the U. S. Bureau of Mines plant at Morgantown, W. Va.

CARL H. LUTZ, southern division superintendent for Dominion Natural Gas Co. Ltd., Buffalo, died Nov. 18 after a sudden illness. He joined Cities Service Co. in Mansfield, Ohio in 1917 and was soon transferred to Dominion's headquarters in Buffalo. Subsequently, he was in charge of the purification plant and compressor station at Glenwood, Ont. and was appointed Dunnville division superintendent in 1925. Mr. Lutz was a director of the Canadian Gas Assn.

A former Public Service Electric & Gas Co. (Newark) vice president, JOHN A. CLARK, died Nov. 23 of a heart attack. Mr. Clark, who was 77, retired in 1945 after 47 years with the company. He joined the Newark Gas Co. as a superintendent in 1898 after serving with East River Gas Co. in New York for 13 years. Newark Gas later was taken over by Public Service and Mr. Clark rose to general superintendent and finally vice president in charge of gas operations.

AUTOMATIC CONTROL
for product or process



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801 ALLEN AVENUE GLENDALE 1, CALIFORNIA

Manufacturers of Automatic Pressure, Temperature, Level and Flow Controls

FACTORY BRANCHES: Baltimore 5, Birmingham 3, Boston 16, Buffalo 3, Chicago 5, Cleveland 15, Columbus 15, Dallas 2, Denver 4, Detroit 21, El Paso, Glendale 1, Houston 6, Indianapolis 4, Kansas City 2, Milwaukee 3, Minneapolis 2, Newark 6, New Orleans, New York 17, Omaha 2, Philadelphia 23, Pittsburgh 22, Salt Lake City 4, St. Louis 3, San Francisco 7, Seattle 1, Tulsa 6, Washington 6, D.C.
DISTRIBUTORS IN PRINCIPAL CITIES

BAKER HIPRESSURE LEAK REPAIR CLAMPS

For repairing corroded pipe sections, leaks, splits and breaks in the pipe which do not extend fully around the circumference, the Baker HiPressure Leak Repair Clamp is without an equal. It comes with bands of 36 ounce pure heavy Copper, 18 gauge Galvanized Iron or 20 gauge Stainless Steel. Soft Neoprene gaskets.

For a permanent repair on water, oil and gas lines, and for use on the higher pressures in these systems, HiPressure Leak Repair Clamps are indispensable in any maintenance program.

Furnished in Clamp widths of 3", 6", 7½", 10", 12½", and 15" Greater widths on application to the factory.

With the New HiPressure Lug!

Write today for your 34 page Baker Catalog. It's good insurance to protect your precious pipe lines with the use of Baker products.

R. H. BAKER & CO., INC. 2070 EAST SLAUSON AVE. HUNTINGTON PARK, CALIF.

CUT COSTS
ON UNDERGROUND
PIPING JOBS

...with a GREENLEE PIPE PUSHER

Installing pipe underground is quick and simple this way. With a GREENLEE Hydraulic Pipe Pusher *one man* pushes pipe through the ground—under streets, railways, walks, lawns, floors. Saves time, cuts costs through elimination of extensive ditching as just a short trench accommodates the Pusher. No tearing up of pavement, lawns, floors... eliminates tunneling, back-filling, tamping, repaving. Cuts job time to a fraction. Pusher often pays for itself through timesavings on first job or two.

No. 790 GREENLEE PUSHER For 3/4 to 4-inch pipe. Six speeds—5,600 to 40,000 lbs. pushing pressure.

No. 795 GREENLEE PUSHER For pipe larger than 4-inch, concrete sewer pipe, large drainage ducts. Six speeds—25,000 to 150,000 lbs. pushing pressure.

POWER PUMP For both sizes of GREENLEE Pushers. Pushes pipe at rate of two feet per minute.

TOOLS FOR CRAFTSMEN
GREENLEE

Get facts on timesaving Greenlee tools now. Write Greenlee Tool Co., Division of Greenlee Bros. & Co., 1952 Columbia Avenue, Rockford, Illinois, U. S. A.

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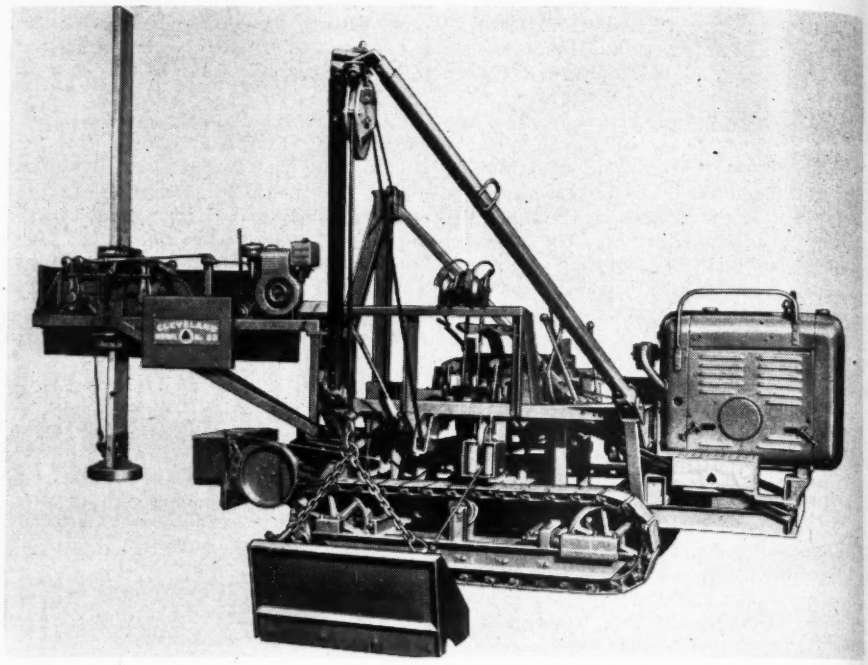


Combination Machine

CLEVELAND TRENCHER CO., 20100 St. Clair Ave., Cleveland, Ohio.

MODEL: 80.

DESCRIPTION: This one-man-operated machine tamps, backfills, lays pipe, unloads and handles pipe, sheathing, etc., and does all types of light crane work. Mounted on a crawler with 24 travel speeds ranging from 1 fpm to 2⅛ mph, the Model 80 tamps while traveling either along the side of the trench or straddling it. The tamper delivers a 380 ft/lb blow, 45 times per minute, compacting the earth in layers 3 to 4 times thicker than is practical by air or hand tamping, the manufacturer says. The tamping mechanism swings to any position to a 90° angle.

The backfiller is a conventional drag-line type with a telescopic boom, and it will operate from either side of the trench. When it is on the same side as the spoil, the boom holds the backfilling blade and pulls it toward the end of the boom, thus actually pushing the spoil into the ditch.

Both backfilling and tamping may be done as the machine travels, although the tamping operation must be within 3¼ ft of the machine.

The power-operated boom is said to lay pipe quickly and efficiently, and all light crane duties involved in trench operations are within the scope of the Model 80. Without extra counterweights, it will lift 6000 lbs located 3 ft from the edge of the crawler track. Standard boom sections are extendable to 15 ft.

The machine is also available as a backfiller-side crane only, with provision made for the addition of the tamper unit later.

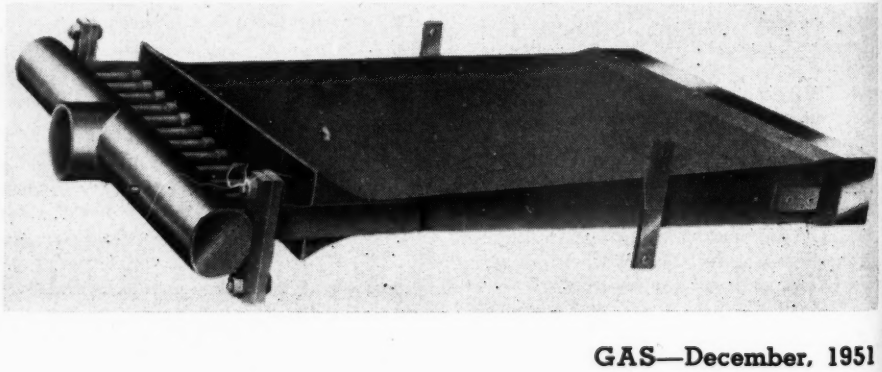
Gas Burner

WEBSTER ENGINEERING CO., Tulsa, Okla.

MODEL: Rectilinear.

DESCRIPTION: This burner represents a unique application of the venturi principle to provide a primary air inspirating unit with a rectangular flame retention nozzle suitable for inter-tube firing of water-walled combustion chambers.

Although originally conceived for this specific purpose, it has been successfully used in a number of applications, including firing in a horizontal plane through fire



doors or small openings over hand-fired coal grates, firing in a vertical plane on either side of a stoker or oil burner, and firing in a horizontal plane over rotary cup type oil burners or stoker hoppers.

Practical applications may be made at pressures as low as 1 psig, and the unit will modulate to 4 oz without flashback. Other advantages claimed for it are small size, light weight, stable flame retention characteristics at high inputs, and low noise level.

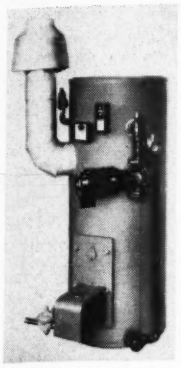
Heating Unit

NATIONAL RADIATOR CO., 221 Central Ave., Johnstown, Pa.

MODEL: National Packet Gu-19-WF and GU-19-WE.

APPLICATION: Designed for installation in homes, stores, individual apartments, motels, etc., where there is a small-to-medium heating load. Compactness (4 sq ft of floor space required) makes it suitable for limited space areas.

DESCRIPTION: This all-in-one plant includes a vertical steel tubeless boiler (its basic part), gas burner with regulating controls, tankless or storage type hot water heater, controls for hot water space heating, and other regulating devices. It is said that the unit will supply hot water systems of the radiant panel, ferrous or non-ferrous convector, cast iron or baseboard radiation type, plus providing adequate hot water.



Important features of the unit, according to the manufacturer, are these: (1) Synchronized operation results from design of all component parts to operate in harmony. (2) Jet flow of heated water is directed through tankless heater coils, scrubbing the heating surfaces and resulting in fast, efficient heat transfer. (3) Maximum water-baked heating surface plus extra water capacity afford maximum radiant heat absorption and economy of operation. (4) Oil-fired Packets can be converted by securing the gas burner and controls.

Model GU-19-WF is a flush jacket boiler and GU-19-WE is an enclosed cabinet type.

Diaphragm Switch

GENERAL CONTROLS CO., 801 Allen Ave., Glendale 1, Calif.

MODEL: L-38 low pressue switch.

APPLICATION: For heating plant installations where it is necessary to operate a switch by a variation in gas pressure.

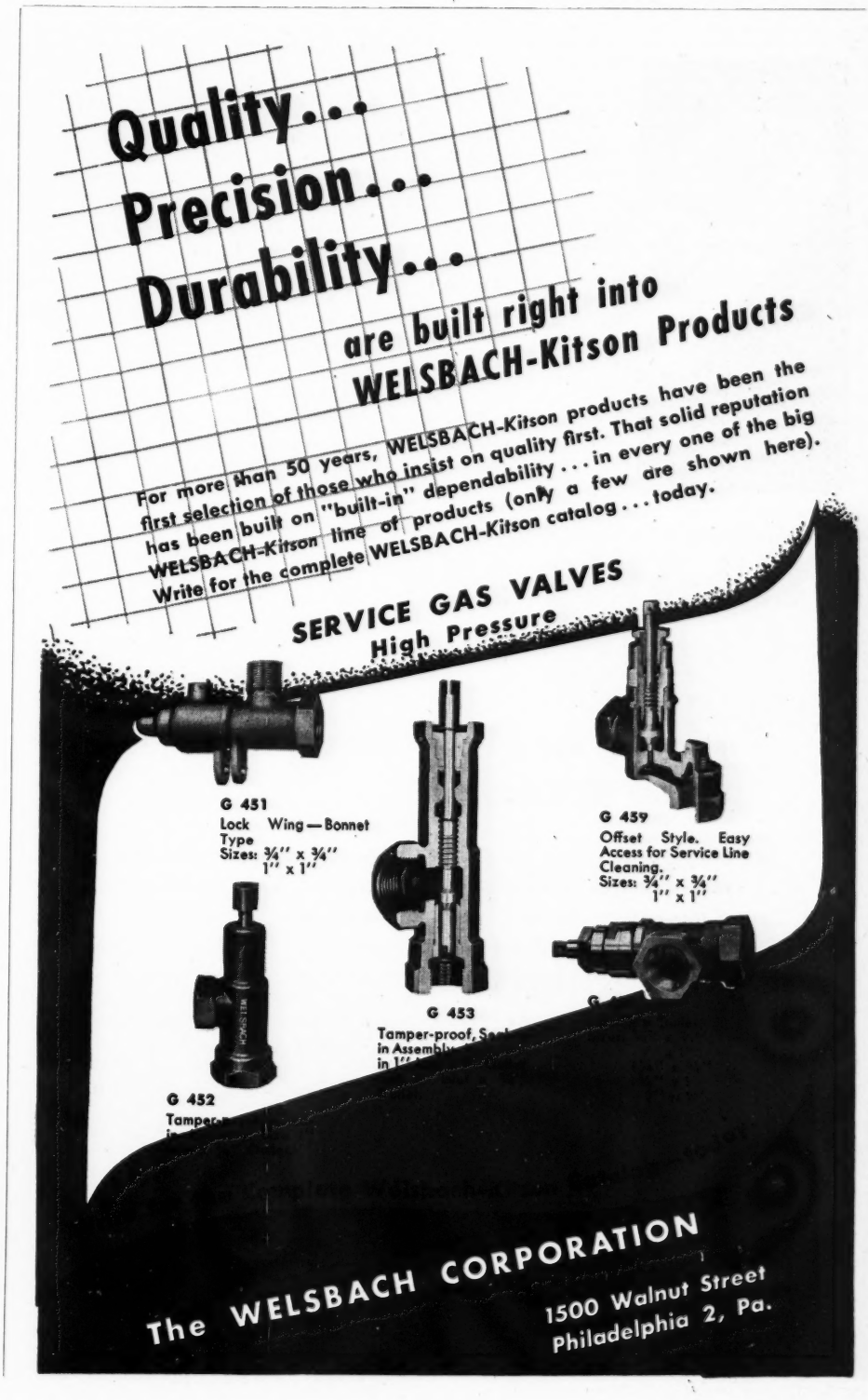
DESCRIPTION: Pressure applied against a spring-loaded diaphragm tilts a mercury tube switch. The diaphragm is made of material impervious to all types of gases, and the spring loading mechanism may be adjusted by a set screw located at the top cover plate. A built-in level in the top cover simplifies installation.

Suitable for air or gas applications, at rated pressures, the L-38 may be installed between an automatic gas valve and a gas burner, for example, where it will insure instantaneous switch operation for a blower or pump motor on heating equipment. It can also be used to turn on signal lights if gas or air pressure fails.

Operating point of the low pressure control is adjustable over a range of 3 to 12 in. of water and pressure differential is 2 to 4 in. of water.

Other New Developments

Front-fired, all-hot tops for Garland commercial ranges are now being marketed under the name Spectro-Heat, according to Detroit-Michigan Stove Co., Detroit. Seven individually controlled, front-fired burners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permit 50% gas consumption without restriction of the cooking area. The tops are 34 in. wide . . .

A new instrument that provides sensitive, instantaneous control of flow, temperature, pressure, liquid level, and other industrial process variables has been announced by Minneapolis-Honeywell Regulator Co. The device, known as the Tel-O-Set controller, is the latest component in a series of devices to improve process control. Others in the group are the differential converter, Tel-O-Set indicator, and Tel-O-Set recorder . . . Another M-H control, the V5119 Watertender, has been designed for automatic water heaters. It consists of a snap-action thermostat, a pilot light adjustment and a thermomagnetic pilot.

ASSOCIATIONS

AGA Departments Elect 1952 Managing Committees

At a joint session of the manufactured and natural gas departments of the American Gas Assn., held during the Oct. 15-17 convention in St. Louis, new managing committees were elected.

Members of the natural gas department's committee are Don E. Herringshaw, Jackson, Mich.; Claude A. Williams and Frank C. Smith, Houston; Arthur F. Bridge, Los Angeles; J. J. Hedrick, Chicago; E. L. Rawlins and A. H. Weyland, Shreveport; and Elmer F. Schmidt, Dallas. Charles E. Bennett, Pittsburgh, continues as chairman of the department and its managing committee.

Leaders elected by the manufactured gas department include E. H. Eacker (chairman), Boston; E. G. Boyer, R. J. Rutherford, and John Postles, Philadelphia; Stuart Cooper, Wilmington; E. W. Doebler, Mineola, N. Y.; Leo H. East, Rochester, N. Y.; John A. Frick, Allentown; N. Henry Gellert, Seattle; H. Hansell Hillyer, Savannah; Ansel B. Huyck, Brooklyn; T. J. Kelly, Fort Wayne; Ronald A. Malony, Bridgeport; Karl B. Nagler, Chicago; R. H. Phillips Jr., Newark; E. J. Tucker, Toronto; and John H. Wolfe, Baltimore.

Wisconsin Utilities Assn. Elects Mikula and Smith

Nothing short of a failure to obtain allocations of vital materials can prevent Wisconsin utilities from completing a current expansion program that will assure customers of a plentiful supply of gas and electricity through 1954, E. H. Cotton, president of the Wisconsin Utilities Assn., told delegates to the convention of the technical and sales divisions at Milwaukee last month.

J. H. Mikula

"Right now, gas and electric utility companies are in the midst of a building program that is costing an estimated $243 million," declared Mr. Cotton, who is vice president of the Northern States Power Co., Eau Claire.

Mr. Cotton was the keynoter for the three-day meeting, which encompassed parallel sessions for gas and electric technical groups, joint technical meetings, and joint sales round tables.

New officers were elected to head up the various divisions. Jack H. Mikula, sales manager for Milwaukee Gas Light Co., was named chairman of the sales and service section of the gas division, succeeding A. G. Bur, Green Bay. New vice chairman is S. L. Hagen, Northern States Power Co., Green Bay.

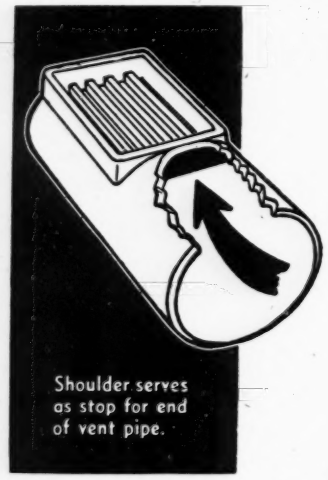
In the technical division, Albert Smith, Northern States Power, Chippewa Falls, succeeds J. C. Bolender, formerly of Milwaukee, as chairman. Vice chairman is Maurice Lewis, Wisconsin Michigan Power Co., Appleton.

Scope of the broad program ranged from regulation to the atom bomb, with a good deal of discussions on a working level in between.

Other Leaders Chosen

Dr. John F. Foster, supervisor of fuels research at Battelle Memorial Institute, Columbus, has been elected chairman of the American Chemical Society's division of gas and fuel chemistry for 1952. He succeeds Dr. Arthur A. Orning of Carnegie Institute of Technology.

George D. Creelman, research director of



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CALENDAR

DECEMBER

American Society of Refrigerating Engineers Annual Meeting — Hotel Roosevelt, New Orleans, Dec. 2-5.

Institute of Cooking and Heating Appliance Manufacturers Semi-Annual Meeting—Cincinnati, Dec. 3-5.

National Warm Air Heating & Air Conditioning Assn. Annual Meeting—Hotel Cleveland, Cleveland, Ohio, Dec. 5-6.

JANUARY

AGA Home Service Workshop — Drake hotel, Chicago, Jan. 21-23.

American Society of Heating & Ventilating Engineers—St. Louis, Jan. 28-30.

MARCH

National Assn. of Corrosion Engineers—Galveston, week of March 10.

Oklahoma Utilities Assn.—Biltmore hotel, Oklahoma City, March 27-28.

New England Gas Assn. — Hotel Statler, Boston, March 27-28.

Mid-West Gas Assn. Annual Meeting—Hotel Radisson, Minneapolis, March 31-April 2.

APRIL

Florida-Georgia Gas Assn. Annual Convention—Soreno hotel, St. Petersburg, Fla., April 3-5.

Maryland Utilities Assn. Annual Convention—Lord Baltimore hotel, Baltimore, April 4.

National Conference of Electric and Gas Utility Accountants—Hotel Commodore, New York, April 7-9.

AGA Distribution, Motor Vehicles, and Corrosion Conference — Benjamin Franklin hotel, Philadelphia, April 7-10.

Southwestern Gas Measurement Short Course — University of Oklahoma, Norman, April 8-10.

AGA Sales Conference on Industrial and Commercial Gas — Netherland Plaza hotel, Cincinnati, April 16-18.

Mid-West Regional Gas Sales Conference—Edgewater Beach hotel, Chicago, April 21-23.

Indiana Gas Assn. Annual Meeting — French Lick Springs hotel, French Lick, Ind., April 24-25.

Southern Gas Assn. Annual Convention—Galveston, April 28-30.

MAY

AGA Commercial Gas School — Chicago, May 5-9.

National Restaurant Exposition — Navy Pier, Chicago, May 5-9.

Public Utilities Advertising Assn.—Hotel Radisson, Minneapolis, May 8-9.

AGA Natural Gas Department Spring Meeting—Biltmore hotel, Los Angeles, May 12-13.

Pennsylvania Gas Assn.—Wernersville, Pa., May 13-15.

Gas Appliance Manufacturers Assn. Annual Meeting — The Broadmoor, Colorado Springs, May 21-23.

AGA Production and Chemical Conference—Hotel New Yorker, New York, May 26-28.

JUNE

Canadian Gas Assn.—Chateau Frontenac Quebec City, Quebec, June 8-12.

Michigan Gas Assn. Annual Meeting — Grand hotel, Mackinac Island, June 23-24.

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the M. A. Hanna Co., Cleveland, was named chairman-elect, and Dr. Harlan W. Nelson, also a supervisor of fuels research at Battelle, was chosen as secretary-treasurer.

* * *

E. M. Borger, president of Peoples Natural Gas Co., Pittsburgh, has been appointed chairman of the AGA committee on economics. The committee is sponsoring a long-range study on the economics of gas house-heating.

December Meetings Finish Busy Association Year

This year's round of association meetings will be substantially completed during the week of Dec. 3-7, beginning with the annual meeting of the American Society of Refrigerating Engineers scheduled for the Hotel Roosevelt in New Orleans, Dec. 2-5.

In Chicago, the Mid-West Regional Gas Sales Council (of the AGA residential gas section) will gather at the Edgewater Beach hotel on the 3rd, and the Institute of Cooking & Heating Appliance Manufacturers will hold its semi-annual meeting in Cincinnati, Dec. 3-5.

On Dec. 4 Pittsburgh's Hotel William Penn will play host to the Eastern Natural Gas Regional Sales Council (AGA residential gas section), and the next day members of the National Warm Air Heating & Air Conditioning Assn. will congregate at Hotel Cleveland in Cleveland. The National Assn. of Manufacturers has announced that its annual meeting will get under way Dec. 5-7 at the Waldorf-Astoria in New York.

There'll be lots of activity at AGA headquarters, too, with the gas production research committee meeting there the 6th and 7th and the executive board conferring on Dec. 7.

One of the last major pre-holiday meetings scheduled is the convention of the Compressed Air & Gas Institute. It will be held Dec. 11-12 at the Drake in Chicago.

AGA Storage Committee

Because of the increasing importance of underground gas storage, the American Gas Assn. appointed a committee on this phase of activity at the annual AGA meeting.

The committee's duties will be twofold: (1) To assemble and publish statistical data relating to the development of underground gas storage and to encourage publication of papers relating to the operation and scientific aspects of storage. (2) To encourage research and other forms of investigation relating to the solution of problems.

Chairmanned by Fenton H. Finn, New York State Gas Corp., Pittsburgh, members include 21 top utility men from all over the U. S. AGA's Eugene D. Milener will serve as secretary of the group.

GAMA Elects New Members

Three companies recently were elected to membership in the Gas Appliance Manufacturers Assn. Two of them are in the industrial gas equipment division, bringing its total to 38, and the third becomes the 50th member of the gas water heater division.

The firms and their representatives are Hauck Manufacturing Co., Brooklyn—Charles W. Hanlon, sales manager; D. W. Whitehead Manufacturing Corp., Trenton—D. W. Whitehead, president, and I. D. Hahn, general manager; and Killam Gas Burner Co., Denver—P. W. Dexheimer, secretary, and F. V. Wedlick.

	80 Police whistle, noisy office	140	Airplane motor test chamber
	70 Automobile passing	130	Pnuematic rock drill
	60 Conversation	125	Airplane motor at 20 ft
	50 Average office	120	Auto horn, thunder, artillery ← **Threshold of Feeling**
	40 Quiet office	110	Boiler factory
	30 Broadcast studio	100	Elevated train overhead
Threshold of Hearing →	20 Rustle of leaves	90	Heavy city street traffic

Fig. 1. Typical sound levels (in decibels).

Reducing NOISE At Regulator Stations

By F. M. PARTRIDGE
Southern California Gas Co.
Los Angeles

THE noise problem associated with the operation of pressure regulators has been a more or less constant annoyance for many years. With the advent of long transmission lines, which often terminate at relatively large measurement and regulator stations in populated areas, the problem has become acute. The reduction of noise from regulators has been accomplished in several different ways and it is the purpose of this report to discuss some of the methods used and to point out the relative merits of each.

Noise may be defined as any sound that has no definite pitch or that is disturbing to persons who hear it. In order to study noise it is necessary to measure its intensity and its frequency.

Results of sound studies are usually expressed in decibels. Zero decibels is the weakest sound that could be heard by a person with very good hearing. For practical purposes any noise below 40 decibels can usually be disregarded.

From a strictly technical standpoint, a given number of decibels represents a ratio, since the decibel is a logarithmic unit. In terms of sound pressure the formula is:

$$\text{Decibels} = 20 \log_{10} \frac{E_2}{E_1}$$

where E_1 and E_2 represent the two sound pressures being compared.

In sound measurements decibels represent not merely ratios but absolute levels, since a standard reference level has been agreed upon. This level is 0.0002 dynes per square centimeter at a frequency of 1000 cycles per second. Since the decibel is essentially a logarithm, addition of decibels produces multiplication of sound pressures. It can be shown that decibel values should be handled as follows:

1. Doubling sound power is about equal to an increase of three decibels, so that when two equal sounds are added together, regardless of their actual value, the resulting sound level is three decibels higher than one of the sounds alone.
2. If you add a 50 decibel sound to a 40 decibel sound the result is a 50.4 decibel sound or a negligible increase.
3. If a sound is 10 decibels or more lower than the background level it will be inaudible and of no importance.

The sound levels of a number of common noises are listed in *Fig. 1* to illustrate the meaning of sound levels expressed in decibels.

Mr. Partridge presented this paper at the PCGA technical section transmission conference in Bakersfield, Calif., May 16-17.

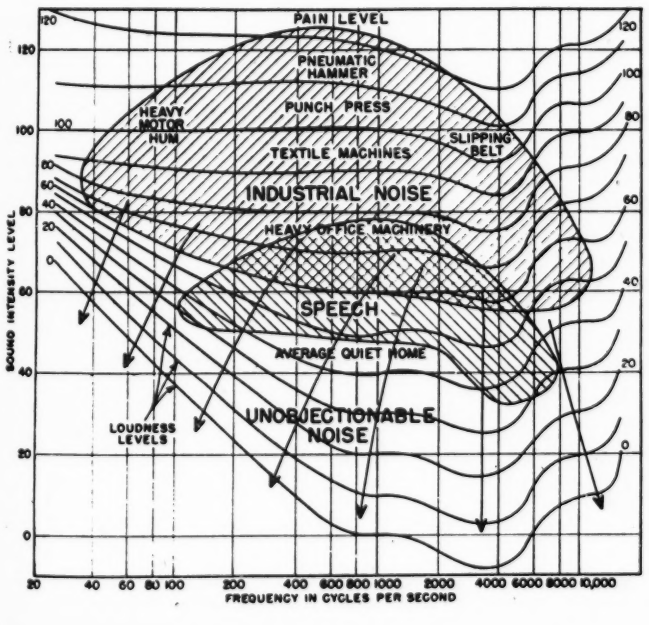

Fig. 2. General ranges of speech and industrial noises.

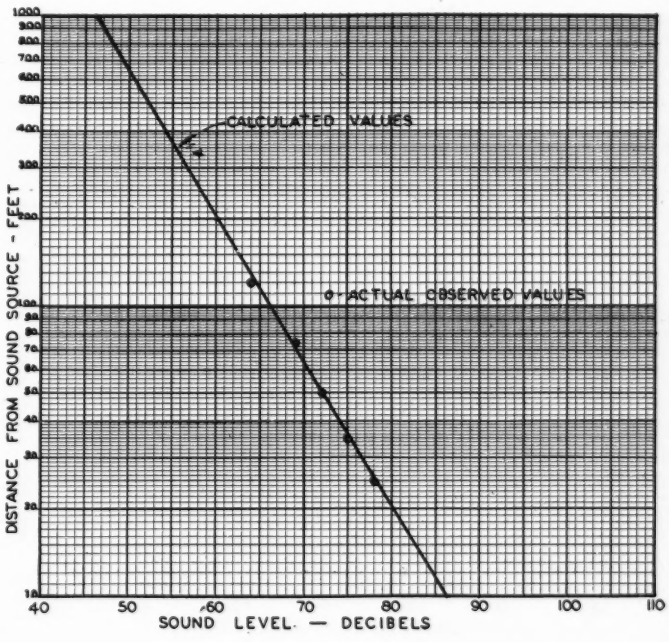

Fig. 3. Distance-sound level curve.

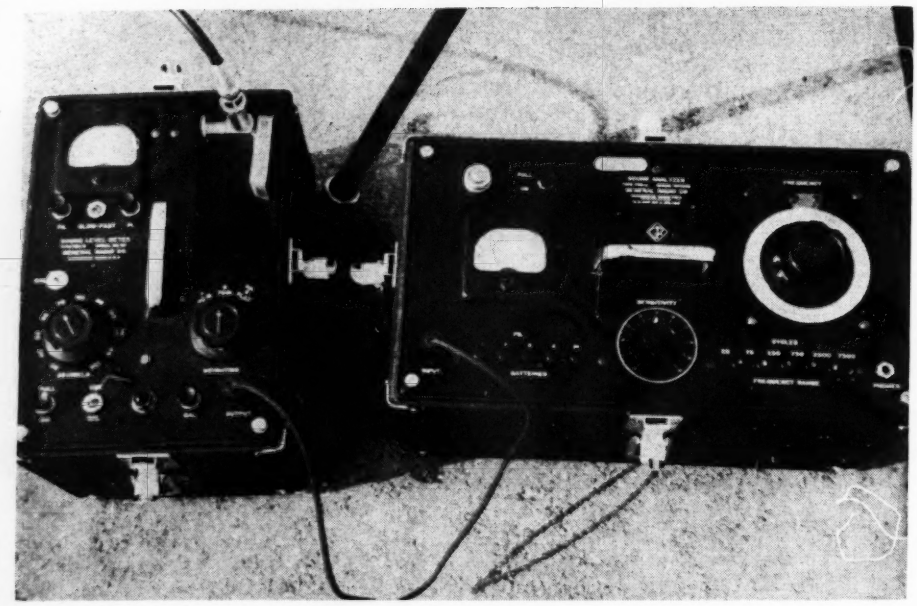

Fig. 4. Sound level meter and sound analyzer.

Fig. 2 shows in the background the Fletcher-Munson equal loudness contours which describe the boundaries of the region of auditory sensation. The part of this region which we use for speech is shown by one of the shaded areas. This is the level, incidentally, at which we like to hear things. It is the level at which we adjust our radios and the level in the average movie theater. It can be noted that seldom in nature is there a noise which extends above this level. When such sounds do occur they are usually associated with terrifying phenomena such as thunder.

It should be noted that the frequency is very important in determining the disturbing effect of a sound. The loudness levels shown are based on the sound level in decibels at a frequency of 1000 cycles per second.

The distance from the sound source to the point of hearing is important in determining what constitutes objectionable noise. In general, the level decreases six decibels each time the distance from a sound source is doubled. For example, if a regulator created a sound level of 100 decibels at a distance of 2 ft, the sound level at 4 ft would be six decibels less or 94 decibels.

The sound level would decrease with increased distance from the source as shown by the curve in *Fig. 3* providing there is no wind or other air movement. This curve can be applied to other cases by drawing a line parallel to the one shown through a known point for the given conditions. Any insulation other than air, such as walls, earth, or building, would further decrease the sound level as the distance to the sound source increased.

The sound intensity level of noises is measured by a sound level meter. With a meter of this type the sound level can be determined in terms of decibels. This value is absolute and can be used as a standard for comparison at any location and with any noise source. The pitch or frequency of the sound is often as important as the sound level in determining whether a given sound should be classed as objectionable or not. The intensity of the components of a sound at various frequencies can be determined by means of a sound analyzer which is connected to the sound level meter. From the results obtained a characteristic curve similar to those in *Fig. 2* can be plotted on logarithmic paper and a decision made as to how objectionable the noise is. A photograph of a typical sound level meter and sound analyzer is shown in *Fig. 4*.

The general methods for reducing objectionable noise levels which are applicable to pressure regulation problems are outlined below.

1. In the case of regulators this is usually accomplished by applying earth, sand, concrete, etc., to the vibrating surface to increase the mass and act as a dampener. The use of common acoustical surface absorbents is not effective except for the absorption of the sound after it has been radiated.

In one station where the sound level was abnormally high the loudest sound apparently came from a 30-in. header in a concrete trench. In an attempt to dampen the vibration and decrease the noise level, the trench was filled with water. As might be expected, the water did not have enough resistance to deformation and it had practically no effect on either the noise or the sound level. The trench was later filled with sand which was effective in reducing the vibration to a satisfactory level.

2. Insulation can be placed as a discontinuity in the transmission path. For air some type of sound shield, such as a wall or partition, can be used. To control sound that is transmitted through piping, ventilating ducts, or some other solid path, the

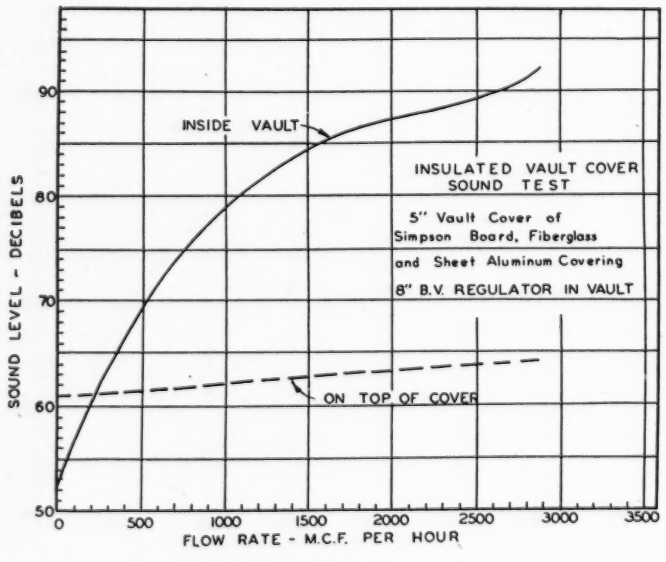

Fig. 5. Efficiency of an insulated vault cover.

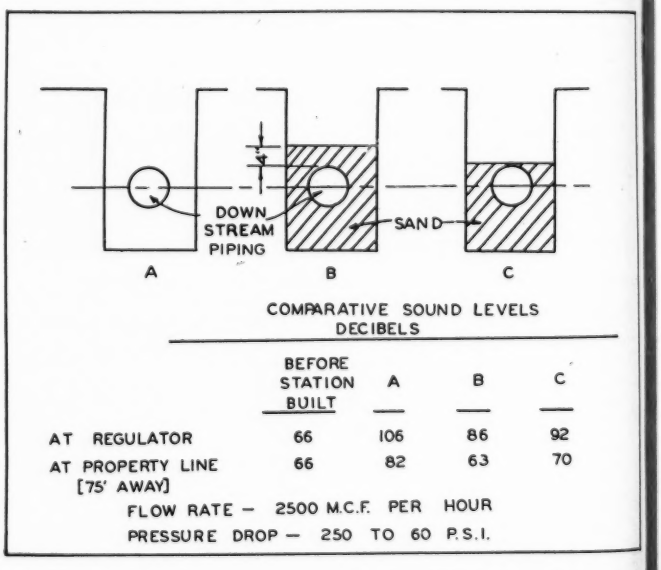

Fig. 6. Effect of backfill on sound from pipes.

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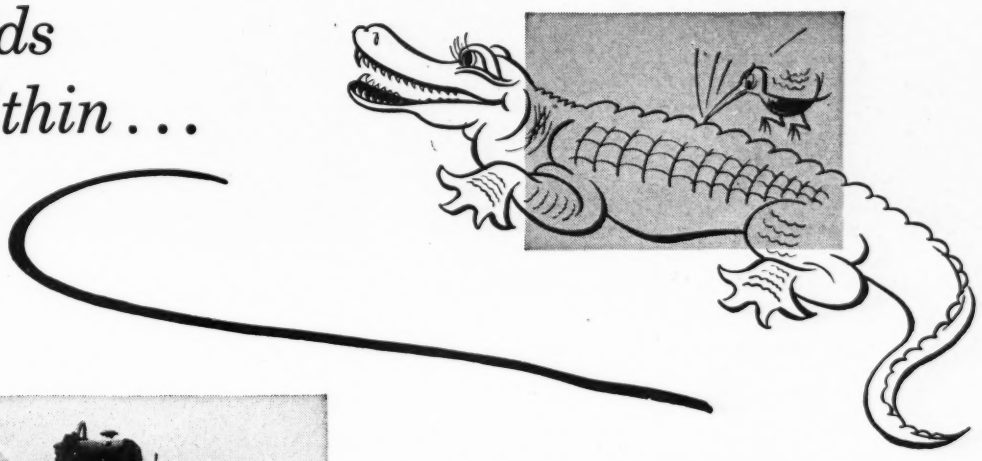

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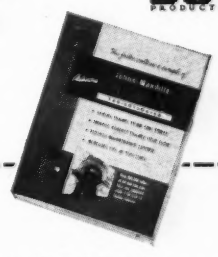

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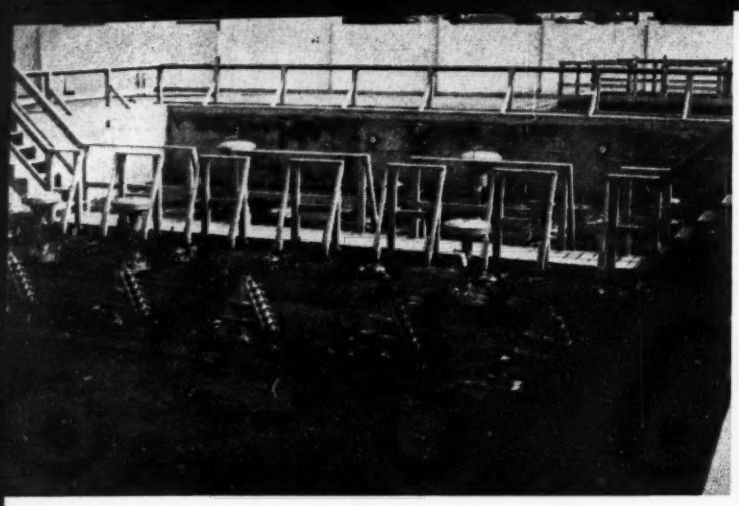


Fig. 7. Meter station with piping covered with sand and black top.

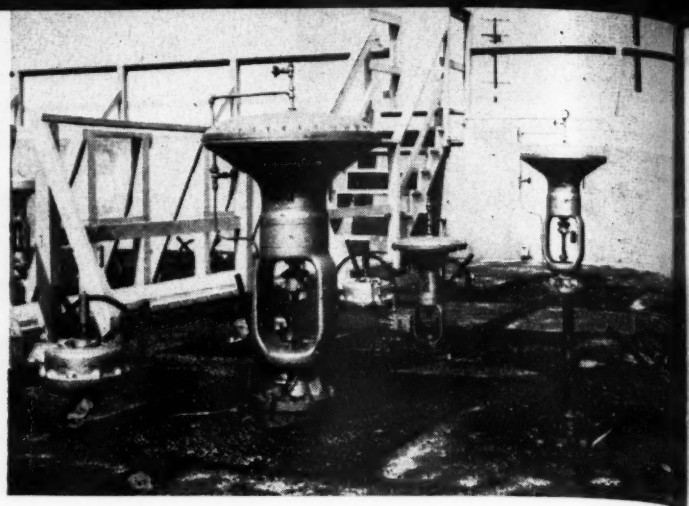


Fig. 8. Regulators and valves partially covered with sand.

use of felt, cork, rubber, springs, etc., is recommended as a sound insulator. This insulation should be placed as close to the source of sound as possible.

3. Install some type of sound absorbent material on exposed surfaces. This type of control is almost always accomplished by applying one of the standard acoustical surface absorbents to the walls, ceilings, floors, etc., surrounding the listening position. The purpose of this type of installation is to improve conditions for those who maintain the regulators and equipment.

Reduction of airborne noise must be done by walls or partitions, large in comparison with the wave length of the sounds whose transmission they are to impede. Wave lengths of common sounds vary with the frequency from 0.15 ft at 7500 cycles per second to 2.25 ft at 500 cycles per second. Reduction of sound transmission through walls is accomplished by applying various insulating materials and providing dead air spaces.

Sound transmission loss in decibels for various partitions varies from 18.5 for 1/5 in. of wood to 59 decibels for a double 2-in. solid gypsum tile wall, the two sections of which are completely isolated structurally with a 4-in. air space between.

Some of the methods used in eliminating objectionable noise conditions are outlined below together with some discussion as to the merits and effectiveness of each:

1. *Vault Cover Insulation.* Probably one of the most common expedients, when a complaint of objectionable noise from an underground regulator station is received, is to apply some sort of insulation to the vault cover. There are, of course, many materials that can be used and the results obtained probably vary in effectiveness from none to satisfactory.

A test was conducted to determine the efficiency of one specially designed insulated cover which was installed on a vault containing an 8-in. balanced valve regulator which had been the source of objectionable noise. The cover consisted of 20-gauge sheet aluminum top for protection from weather over ½-in. Simpson roof insulation board, 4 in. of Fiberglas with 2- x 4-in. Simpson board frame and ⅛-in. thick Masonite Tempered Presdwood Perforated for a bottom covering. This cover was not designed for traffic loads but could be used in fenced areas or as an inner cover on standard vaults. Some method of sealing must be provided to prevent sound leakage around the edges of the cover.

Simultaneous readings of sound levels inside the vault and on top of the vault were recorded as the flow through the station was gradually increased from 0 to 3000 Mcf per hour. With a pressure drop across the regulator of approximately 130 psi, the sound level inside the vault increased 40 decibels while on top of the vault the increase was only 3 decibels when the flow rate was increased. Curves showing the variation in sound levels inside and outside of the vault as the flow rate varied are shown in *Fig. 5.*

2. *Sand Covering.* An inexpensive and convenient method that can be readily applied to reduce sound levels emanating from piping is to cover the piping with earth or sand. In one case it was possible to obtain comparative sound levels at a regulator station, first with the pipe exposed, then with the piping buried with 4-in. cover in sand and finally with some of the sand removed so that the top of the pipe was exposed. As could be expected, the sound levels under similar conditions of flow varied from 106 decibels for exposed pipe to 86 decibels when the pipe had 4-in. cover and then to 92 decibels when the top of the pipe was exposed. The condition of the pipe under the various conditions and a comparison of the various sound levels are shown in *Fig. 6.*

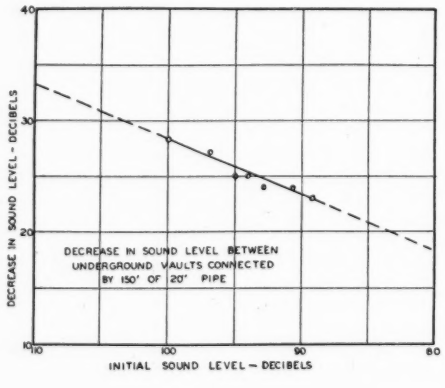


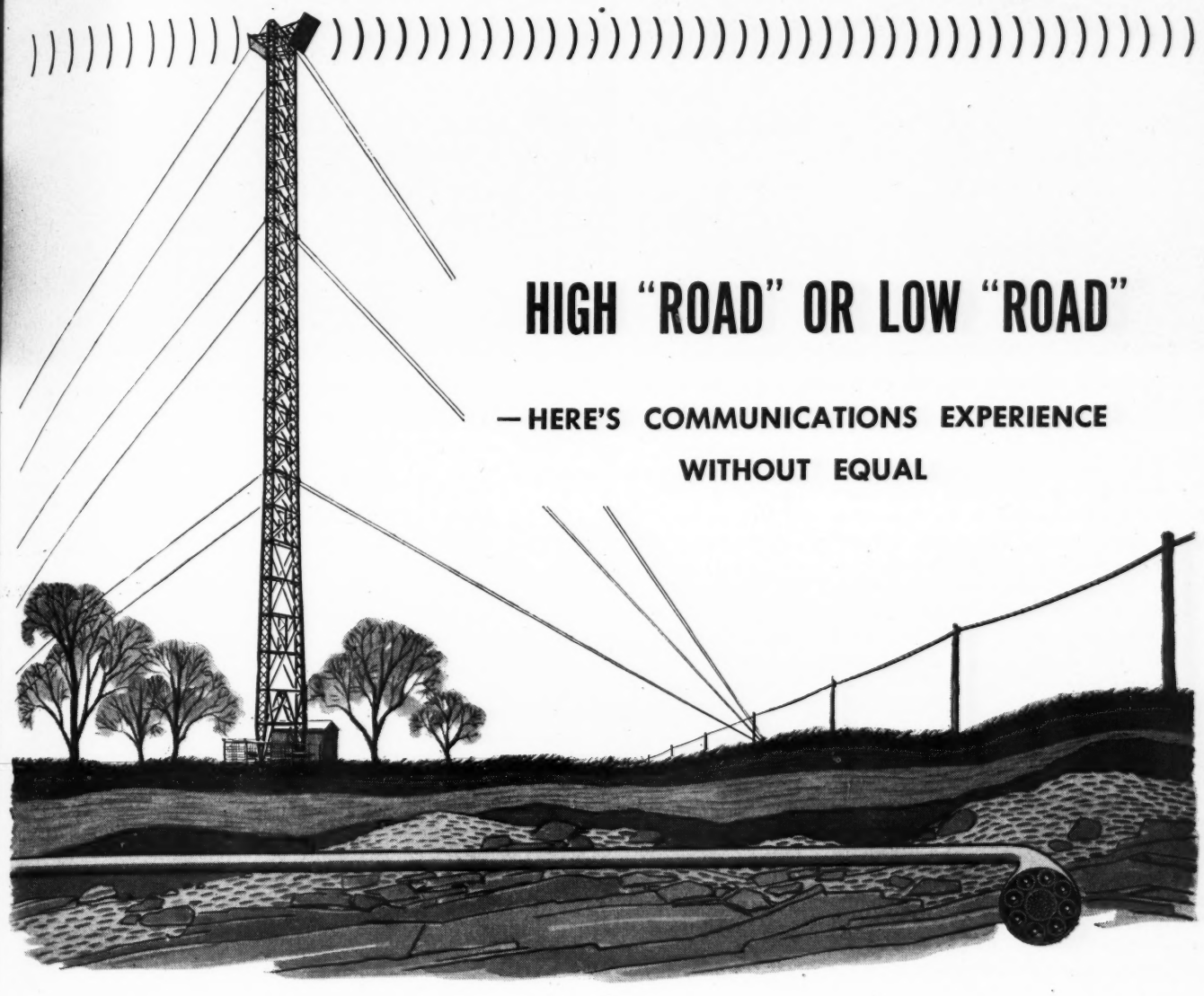
Fig. 9. Transmission of sound through underground piping.

The station referred to above was finally finished with approximately 4 in. of cover over the meter tubes and piping and boxes were built around orifice fittings, regulators, and valves. A thin layer of black top was applied to provide a better appearance and keep the sand cover in place. *Fig. 7* shows a general view of the station meters, and the details of the boxes and sand cover of the regulator bodies are shown in *Fig. 8.*

Sand is more desirable than most types of earth as a sound insulator or absorber because it contains considerable air space and tends to stay in close contact with vibrating piping. Many types of earth, on the other hand, have a tendency to pack and voids are created by the piping vibration.

It was possible to obtain some data on the transmission of sound through buried pipeline from one vault downstream through 150 ft of 20-in. pipe to another vault. The sound reduction was greatest at the higher sound levels varying from 28 decibels, when the upstream sound level was 100 decibels, down to 23 decibels when the upstream level was 89 decibels. The variation in the sound reduction as the sound levels varied is shown by the curve of *Fig. 9.*

At one of the stations built in the Los Angeles area recently all of the piping was installed underground with vaults around the orifice meters only. The valves are all buried and are operated with hand wheels on extensions. Pressure control is done with motor-oper-



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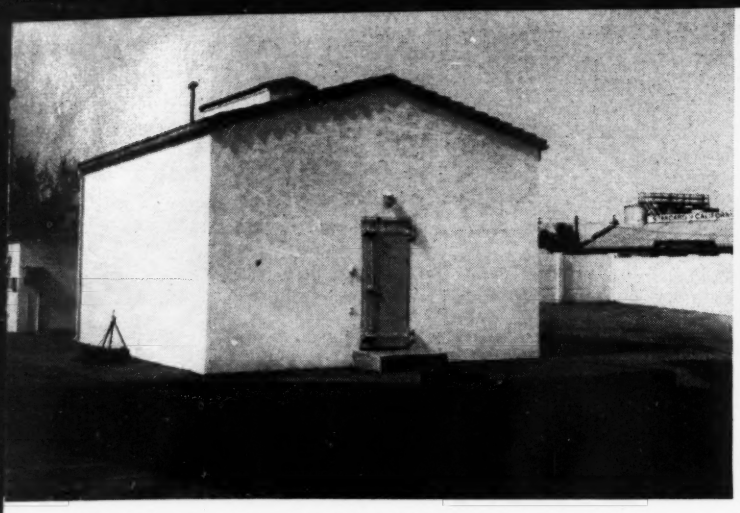

Fig. 10. Sound insulated regulator building; double doors and no windows.

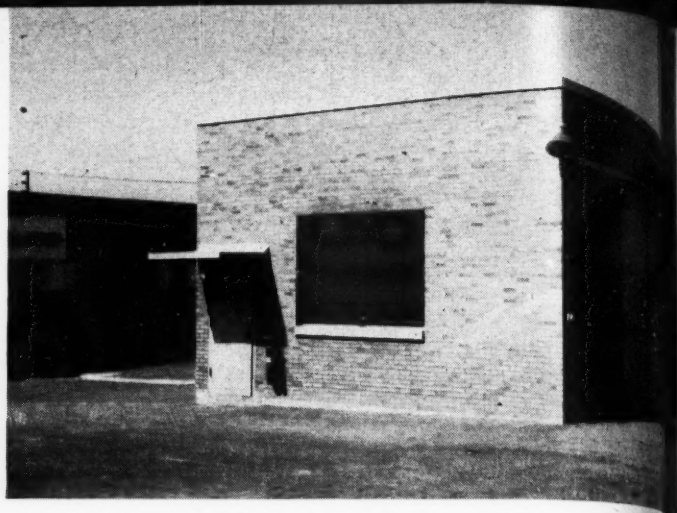

Fig. 11. Sound insulated regulator building; double windows with air space between.

ated plug valves with extended gearing. The gearing and pneumatic motor are aboveground mounted on an extension on the valve body. The sound created by the gas passing through the valve is somewhat greater than that created by a balanced valve regulator but is effectively absorbed by the earth or sand backfill. Comparative sound levels are shown in *Table 1.*

At the time these readings were taken there was only about 1 ft of cover over the piping. When the normal 3 ft of cover is in place, it is probable that the sound level in the immediate vicinity of the pressure control valve will be appreciably lower.

In this type of installation it is important to take into consideration the possibility of sound transmission through the extended hand wheels and operators connected to the underground piping.

3. *Sound Insulation.* The effectiveness of sound insulation applied to building walls varies greatly with the type of construction. This insulation ranges from using any material at hand which could conceivably act as a sound absorbent to such expensive procedures as constructing a building with double walls on separate foundations with no structural interconnection. One building tested which is shown in *Fig. 10* was constructed as follows, starting with the outside surface:

3″ reinforced gunite concrete
1″ Celotex
3⅝″ for 2″ x 4″ studs
6⅞″ dead air space and steel columns
½″ plain plaster board
3⅝″ for 2″ x 4″ studs
½″ Celotex
1⅝″ for 2″ x 3″ stripping, horizontal, 12″ O.C.
1¼″ Acoustic-Celotex

22″ Total

The sound insulating efficiency of a building of this type would be appreciably improved if there were no mechanical contact between the inner and outer walls and they were constructed on separate foundations. Tests conducted at the above building showed a sound level of 96 decibels inside and 60 decibels outside at a position 2 ft from the wall.

This sound level would decrease as the distance from the building was increased and at the property line the sound from the regulator building was appreciably lower than the minimum background noise of 55 decibels. The loss of 36 decibels through the building wall is not a true indication of the efficiency of the wall. It is probable that part of the sound picked up outside of the building was from another source and that the insulating efficiency of the wall was considerably better than indicated on this test.

In constructing insulated buildings, or in insulating existing buildings, it is necessary to consider piping and ventilating ducts which may provide a path for noise transmission. Two solid doors made with ordinary 2-in. T&G hardwood with a minimum of 8 in. dead space between is better than a special soundproof door. The two doors should accomplish approximately a 50-decibel reduction in sound level.

Another building constructed of a 9-in. brick wall with inner lining of ½-in. mineral wool blanket, ½-in. air space, gypsum lath and plaster and equipped with double windows with air space between is shown in *Fig. 11.* The sound reduction through this building wall, which theoretically should have been 62 decibels, was actually found to be approximately 40 decibels. This also was probably due to the fact that some of the noise outside of the building originated at other places than inside the building.

4. *Comparison of Regulators.* To investigate the possibility of one type of regulator being superior to another in respect to low noise production, a series of tests was conducted under varying but carefully controlled conditions of pressure drop and rate of flow. Six types of 2-in. regulators and one 2-in. plug valve were tested under identical conditions while acting as pressure reducing valves. Volumes varied from 25 to 150 Mcf/hr and pressure drops varied from 60 to 160 psi with a constant inlet pressure of 210 psi.

The results obtained from all tests were averaged together for each regulator in order to determine their relative merits as shown in *Table 2.*

It is probable that the high sound level produced by the single seated regulators was largely due to extreme turbulence in the gas stream downstream from the regulator. Installation of an expansion section on the outlet of the regulator would tend to relieve this condition by lowering the velocity of the gas stream. It had been anticipated that the single seated control valve would create a lower sound level, but such was not the case.

It was possible also to conduct a test on three 8-in. regulators which are connected in parallel so that any one of the three could be turned on and operated under exactly similar conditions. Two of these regulators are of the standard balanced valve type, one with a quick-opening inner valve and the other with a V-port. The third regulator is a more recent model which has no conventional diaphragm and valves but uses an expansible tube over a slotted steel sleeve which replaces both the diaphragm and the valve.

It was found that the noise right at the regulator was lowest, in the case of the expansible tube type regulator, but that the sound two or three pipe diameters downstream was higher in the case of the expansible tube regulator than for the regulator with the quick-opening type of valve. This was possibly due to the type of turbulence set up in the regulator in much the same manner as it was in the single seat regulator test.

The total noise levels observed for the three 8-in. regulators when operating under identical conditions were as shown in *Table 3.*

It should pointed out that if the expansible tube type regulator were in-

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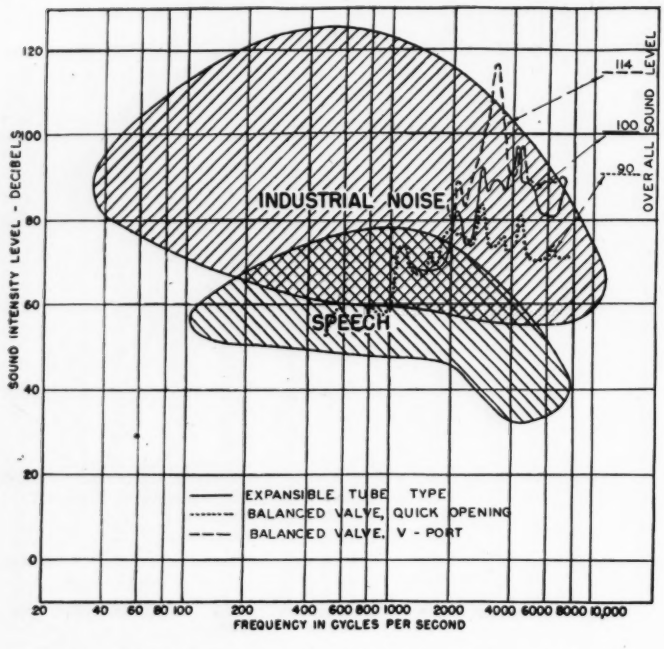

Fig. 12. Sound frequency curves for three 8-in. regulators.

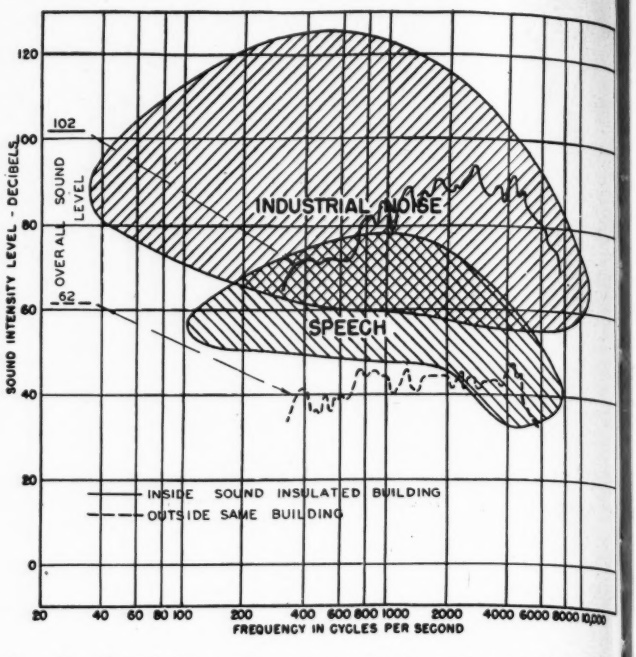

Fig. 13. Sound frequency curves inside and outside building shown in Fig. 11.

stalled in a vault with its outlet close to the vault wall, or if the regulator were entirely buried, the sound problems would be largely overcome.

The sounds created by these three regulators were analyzed and their characteristic curves plotted, as shown in *Fig. 12*, with the normal speech and industrial noise areas indicated for comparison.

As pointed out above, the frequency of various sound components is as important as the total sound level in many cases. A shrill whistle or screech is often more irritating than a lower pitched sound of greater intensity. Unfortunately, pressure reducing regulators often cause noises with a shrill or whistling characteristic. In *Fig. 13* is shown the frequency curve for a balanced valve regulator inside the sound-insulated building shown in *Fig. 11* and a similar curve for the same regulator as measured outside of the building.

It is felt that objectionable noise conditions at pressure reducing regulator stations can be eliminated satisfactorily by one of the methods described in this paper.

The choice of methods must be largely governed by local conditions, cost, and the sound level permissible in the vicinity. To entirely mask a sound, it should be reduced to a level 10 decibels below the background noise at the listening position, but in many cases it is not required that this standard be maintained.

Consideration of the noise problem when planning new regulator stations or similar installations is becoming essential. While prompt action in eliminating objectionable noise conditions is commendable and is instrumental in furthering our public relations, the use of sufficient foresight to prevent the unwanted condition from occurring is much more desirable. Maintaining satisfactorily low noise levels at gas company installations is fully as important as appearance, etc., in obtaining building permits and zone variances when needed.

Present laws are not definite in limiting noise largely because there is no established standard as to what constitutes harmful or objectionable noise. Continuation of a policy of preventing or eliminating noises that are causes for complaint will go a long way in making the enactment of restrictive noise abatement laws unnecessary.

TABLE 1. Comparative Sound Levels Using Sand Covering

	At M.O. Valve Pres. Regulator	At Nearest Property Line
Before station constructed	56	55
Station in normal operation	74	56

TABLE 2. Comparison of Regulator Noise Production

Regulator	Valve	Average Sound Level Decibels
Balanced valve regulators	Ratio plug	73
	Throttle plug	74
	V-Port	73
	Quick-opening	77
Single seated regulators	Angle type	94
	Straight type	80
2-in. plug valve		83

TABLE 3. Noise Levels For Three 8-in. Regulators

Regulator	Sound Level-Decibels At Regulator	12-In. Downstream	24-In. Downstream
Balanced valve regulator			
V-Port valve	98	110	110
Quick-opening	87	89	89
Expansible tube type	84	100	99

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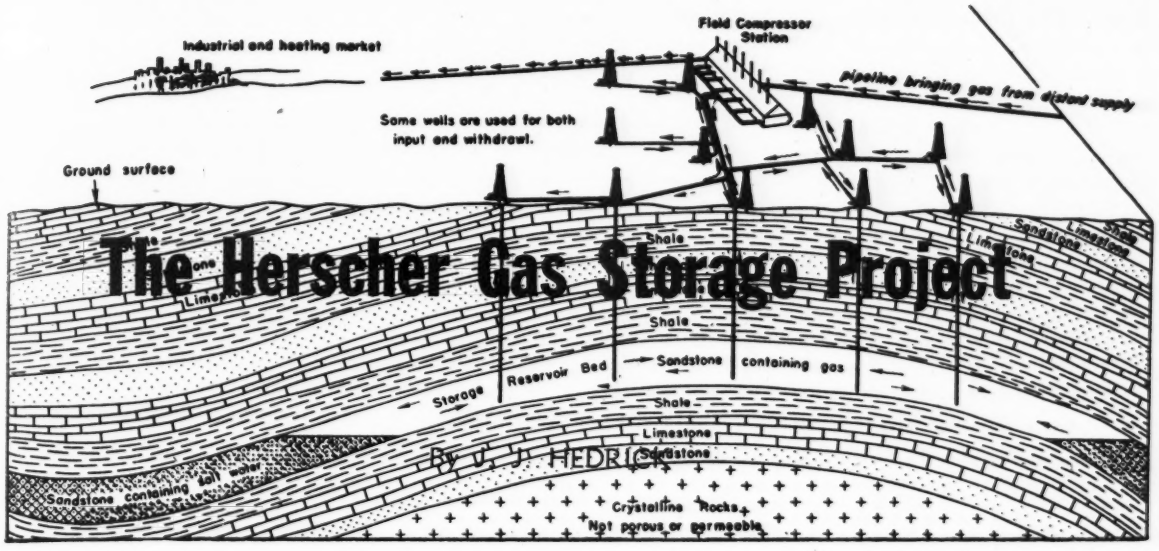
The Herscher Gas Storage Project



MANY underground gas storage installations are being used by the pipeline and distributing companies in serving natural gas in larger cities of the United States, and nearly 100 fields that formerly held oil or gas have been developed for that purpose.

However, in northern Illinois no such fields are present and drilling exploration has fairly well indicated that they are not likely to be found. There are several oil and gas fields in southern Illinois that may now or later be available for storage purposes, but they are at least 200 miles away from our markets and even if readily available at this time would not seem as economic as the Herscher storage project, principally because of the distance from our markets.

It has, therefore, been necessary for us to develop underground storage, for the benefit of all our customers along both pipeline systems, without the use of depleted oil or gas fields. To do this, exploration has been necessary to find the conditions suited for safe and adequate underground storage.

In examination of possible areas to be used for storage of natural gas, it was desirable to find a location where the geological conditions were exactly similar to those of a natural gas or oil field but where no oil or gas was present in the formation, because of the lack of mineral or animal deposits, whichever you please, that may have been the source of oil or gas.

The first thing to look for was a dome where the rocks, due to internal forces within the center of the earth, had been formed into a sort of inverted saucer under which some porous bed suitable for a gas reservoir was overlain by thick tight beds of cap rock or shale through which the gas could not escape.

Close to the pipeline terminus at Joliet, Ill., all such beds and structures contain fresh water, and although we have been told that gas storage is as readily done in such places, it is not considered desirable to place gas in a formation containing fresh water when some day that water may be produced for public, industrial, or private use. Therefore, it was necessary to look further for a formation containing salt water or water for some other reason not potable.

In 1928 the Illinois Geological Survey published a bulletin on the Herscher area called the "Herscher Anticline." That anticline is located about 40 miles south of Joliet and about 15 miles east of the main line of Texas Illinois Natural Gas Pipeline Co. Directly underneath the town of Herscher, having a population of only a few hundred people, salt water had been discovered in deeper wells and the region appeared to be an area suitable for gas storage.

This area was called to our attention by the Public Service Co. of Northern Illinois several years ago. All the water well records that could be found in the area were collected and studied and sufficient evidence was found to justify prospecting the area near Herscher in Kankakee and Iroquois counties. This evidence pointed to the presence of a dome with tight cap rock overlying a deep sandstone. However, the exact position and all of the facts could not be determined from the evidence we then had, and additional exploration was necessary.

It became apparent that the shallow limestone, shale, and sandstone beds closer to the surface were folded or formed into the shape of an anticline. It was therefore possible that the position of the shallower beds would indicate the position of the deeper beds below the surface. In the fall of 1950 permission was secured from Kankakee county and township authorities to drill shallow wells along road rights of way and the testing program was begun. Mobile truck-mounted drilling rigs, commonly used in water well drilling, have at this time* drilled approximately 80 shallow holes at various locations in the area to determine the position of these shallow beds.

As soon as the shallow drilling had progressed far enough to indicate the presence of the deeper dome suitable for the storage of natural gas, it became desirable and economic to drill into what was thought to be the formation we were looking for. To do this, large oil and gas rotary drillings rigs were used, capable of drilling a core test through the formation.

These tests penetrated to a very porous sandstone which lies from about 1715 ft below the surface near the top of the dome to nearly 2000 ft on the lower slopes. Tests were made in these wells to determine the character of the

*Sept. 24, 1951.

At a round-table discussion on underground gas storage held as a part of the program of the annual meeting of the Independent Natural Gas Assn. of America in Oklahoma City Sept. 24, the potentialities of water sands for storage were given close attention. With depleted oil- and gas-sands unavailable in many territories where large storage is most urgently needed, gasmen are giving increasing study to other favorable formations.

In GAS last month, Dr. Ionel Gardescu's contribution to the round-table, "Storing Natural Gas in Underground Water Sands" was presented as an authoritative estimate of the possibilities of this type of storage. This paper by Mr. Hedrick, prepared for the same occasion, is published here as a logical companion piece.

Mr. Hedrick is president of three subsidiaries of Peoples Gas, Chicago: the Natural Gas Pipeline Co. of America, Texas Illinois Natural Gas Pipeline Co., and Natural Gas Storage Co. of Illinois.

fluids contained in the sandstone, and salt water was found. Underlying formations at about 1300 to 1400 ft were found to contain sulphur water, thus indicating that the salt water sand, which was of interest to us, was overlaid with an impervious formation separating the two waters and that a good seal existed.

The tests also showed that the floor was impervious. Seismograph work is now being conducted to check the information secured by the drilling and to further determine the exact center and shape of the anticline. The diagram illustrates a rather simplified idealized cross-section showing the relative location of the various formations penetrated.

Rock Formations Tested

During the drilling, core tests of all the deep lying rock formations were secured, and for several months laboratory tests were made on all these cores to confirm the porous nature of the reservoir and the character of the overlying rocks. Chemical tests were made of the waters in the various zones in state laboratories and every possible study was made of the suitability and safety of the area for the storage of natural gas.

Of course, we had no natural gas available with which to test the formation because the Texas Illinois line was not and is not at the present time completed. We did run production and injection tests by the use of water in two of the deep wells that had been drilled; that is, water was produced from one well and injected into the other, and vice versa, to determine the rate the sand would give up and take water.

It was a comparatively simple matter to convert as between viscosity of water and that of natural gas, and that is what we will have to rely upon for a long period of time even after large sums have been spent in the development stage prior to the availability of natural gas. However, it is believed that little difficulty will be found in making predictions as to the behavior of gas from the water tests.

The results of all of these investigations have indicated to us the suitability of the region investigated for the effective storage of natural gas underground. It is believed that with proper equipment, both dehydration and compression, as well as an adequate number of wells for injection and production (the same well being used for both), we can ultimately develop at least an effective storage of something in excess of 90 billion cu ft, with a withdrawal capacity of 1.5 billion cu ft per day. The initial cost of the project will be approximately $18 million for a minimum amount of storage the first year and about $36 million fully developed for 90 billion cu ft usable annual storage.

Not only have our own engineers and geologists supervised this development, but we have also obtained the services of Max W. and Douglas Ball of Washington, internationally known oil and gas consultants and authorities on the underground storage of natural gas, as well as Carl Bays, geologist and production engineer of Urbana, Ill., who was formerly with the Illinois Geological Survey, and who is thoroughly acquainted with not only oil and gas production but the geology and formations underlying this particular area.

The subsurface character of the area is such that we are assured the 90 billion figure is a minimum and that a much larger area is usable without approaching the spill point.

The bottom hole sand pressure of the water is 720 lbs. It is assumed that the gas injection pressure of something over 1100 lbs will be required to push back the water and form the desirable bubble on top of the water. The area contains about 15,000 acres with a sand thickness of about 100 ft.

Design plans are now being made for the necessary compressor station, dehydration plant, wells, gathering lines, injection lines (which will be the same), and the line from the Texas Illinois main line to the area. Another line (or lines), as the size of the storage develops, may be required from the area to the delivery point near Joliet. The compressor station and dehydration plant will be somewhat like the stations on our present system. Housing accommodations will also be provided for employees. The project will be of great benefit, we believe, to the town of Herscher and to Kankakee and Iroquois counties.

Livingston County Project

We have another storage project but, for the time being, further studies in regard to it have been discontinued. I think it may be of some interest.

In the early part of 1949 and before work on the Herscher project had gotten underway, the idea was conceived that gas might be stored in a cavern excavated in an impervious subsurface formation. Development of studies looking toward such a man-made cavern for the storage of natural gas was undertaken by the engineering firm of Ford, Bacon & Davis.

A site was selected near the south end of Lake Michigan on which to drill test holes to seek such a formation, because we were advised by the geologists and engineers that that section of the country was underlaid with a solid limestone of sufficient depth. Accordingly, a number of test holes were actually drilled, but soft spots, cracks and crevices found in the formation rendered it unsuitable for the storage of natural gas, and this site was abandoned.

In August 1950, options were taken for the purchase of 450 acres of land in Livingston county, Illinois, almost adjacent to the Texas Illinois pipeline. Six core test holes were drilled around the perimeter of the tract, and from a study of the drilling data and physical and chemical tests of the cores it was determined that a suitable zone of limestone occurs at a depth of approximately 1075 to 1135 ft.

The limestone comprising this zone is non-permeable and is in turn overlaid by a thick gas-tight zone of massive shale. In addition, the high strength quality of the stone would allow for the development of stable underground openings 50 ft high and having a maximum roof span of 49 ft. It was proposed to excavate by the room-and-pillar-mining method the underground opening in this limestone horizon so as to form at least three separate compartments having a total gas storage capacity of 20 billion cu ft under a maximum pressure of 1000 psig.

Disposition of Limestone

One of these storage compartments could serve as a peak load unit and the remaining two as base load units so as to give ideal gas storage operations. Excavation of the storage units could progress at the rate of approximately 4.5 MMcf of storage capacity annually.

Because the excavation of these large caverns for the storage of natural gas would involve the mining of tremendous quantities of limestone, the costs of storage depended upon whether the limestone could be sold to offset, to some extent, the excavation costs, because we would be producing from 14,000 to 16,000 tons per day run-of-the-mine limestone, or about 4,250,000 tons annually. Production in the first five years was estimated at approximately 18 million tons.

This presented to us the problem of disposition of the limestone. For instance, if the limestone were not disposed of, the total cost of completing a storage cavern capable of containing 20 billion cu ft of gas, including cavern units, cushion gas, compressor station facilities, pipelines, etc., would amount to about $45.5 million. But if the limestone could be sold, say at $1.25 per ton, the total net investment would only amount to $19.5 million; thus the storage cost would be 29 cents per Mcf without the sale of limestone and 14.8 cents with it.

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year of operation. The cost during the earlier years of operation would be substantially higher, say 36.9 cents per Mcf in the first year, without the sale of limestone, and 18 cents per Mcf with the sale. However, owing to the fact that the development of the Herscher storage has progressed to its present state, the cavern storage project has been temporarily discontinued.

In the development of the two storage projects, my two companies have worked in close cooperation with the officers and representatives of Peoples Gas Light & Coke Co., which owns all the capital stock of Natural Gas Pipeline Co. and a majority of the capital stock of Texas Illinois. As a matter of fact, the Peoples Gas officials developed almost in its entirety the man-made cavern project. After the formation of Natural Gas Storage Co. of Illinois, an agreement was made for that company to take over all the information and studies and property rights theretofore acquired by Peoples Gas, subject, of course, to approval of the Illinois Commerce Commission, which has jurisdiction over the latter company.

With respect to the Herscher storage site, we believe it is not reasonable to assume that when we start the acquisition of rights to store gas, to drill wells, construct gathering and injection facilities, we will be able to do so by voluntary arrangement with all the 300 or more landowners. The area is one of the best farming sections of the state. So it was highly desirable that the storage company acquire the right of eminent domain which it did not have under federal or state law.

Eminent Domain in Effect

A bill was introduced in the early part of the 1951 session of the Illinois general assembly giving to any corporation which is engaged in or desires to engage in, the distribution, transportaton, or storage of natural gas or manufactured gas, which gas, in whole or in part, is intended for ultimate distribution to the public in the state of Illinois, the right of eminent domain under certain conditions. That bill was passed by the Illinois general assembly and became effective on July 1, 1951.

Before the right of eminent domain may be exercised, however, it is necessary that such corporation make application to the Illinois Commerce Commission for an order and receive an order approving the proposed storage project. In the absence of the need for eminent domain, no such proceeding before the Illinois Commerce Commission is required unless state-owned lands are involved.

No such order shall be issued by the commission unless it shall contain and be based on findings that the proposed storage will be confined to a geological stratum or strata lying more than 500 ft below the surface of the soil; that the proposed storage will not injure any water resources; that the proposed storage will involve no condemnation of any interest in any geological stratum or formation within the area of the proposed storage project containing oil, gas or coal in commercial paying quantities, producible through primary production methods, either with or without pressure maintenance, or secondary recovery methods of any type; and that the public convenience and necessity of a substantial portion of the gas-consuming public in the state will be served by such acquisition.

The law also gives the corporation the right to utilize state-owned property for the purpose and the Illinois Commerce Commission fixes the amount payable to the state. It further requires that such corporation carry public liability insurance in an amount determined by the commission to secure payment of any damage resulting from any occurrence arising out of or caused by the operation or use of the gas storage reservoir. The law requires that such insurance be maintained for a period of at least ten years from the date of the beginning of operation or use of the project, and provision is made for renewal of the insurance should the commission so order.

The law also provides for a notice of the hearing before the commission to be published in a newspaper in general circulation in the county where the property lies, and as to those from whom rights have not been secured, registered notices shall be served at their last known address as shown by the tax records of the county.

We have formed another corporation that will operate the storage project. This corporation will be known as Natural Gas Storage Co. of Illinois, which is and will be under the same management as Natural Gas Pipeline Co. of America and Texas Illinois Natural Gas Co. Natural Gas Storage Co. has filed an application with the Illinois Commerce Commission for approval of the project as provided in Illinois Senate Bill 128 and has also filed an application with the Federal Power Commission, as a natural gas company, for a certificate of convenience and necessity to construct and operate the project.

In connection with the right of eminent domain for storage purposes which has been granted to pipeline and gas storage companies in the state of Illinois, on March 1, 1951, Senators Douglas and Dirksen of Illinois introduced in the Senate S. 1000, a bill to amend section 7(h) of the Natural Gas Act, giving to natural gas companies the right to condemn lands for the storage of natural gas in addition to the right they now have to condemn for right of way. This bill was thought to be one to which few people—with the exception, of course, of the coal and related interests—could have any objections. It was a very simple amendment and seemed to accomplish the purpose.

We ran into some objections from some of the oil interests, just as we did while Senate Bill 128 was pending before the Illinois general assembly, in that they were fearful there would be an attempt to condemn lands producing or capable of producing oil or gas. Therefore, a proposed revision was made by our representatives and representatives of those oil interests who were seeking an amendment to protect themselves, and that revision has been handed to the senate committee considering S. 1000. Also, there was some objection by even members of the natural gas industry because some were fearful that an attempt might be made by one natural gas company to condemn a partially depleted field belonging to another. A provision was inserted protecting against that eventuality.

TIPRO Main Obstacle

The most serious obstacle we have to overcome in inducing Congress to pass S. 1000 is a proposal by the Texas Independent Producers and Royalty Owners Assn. They stated that the primary purpose of the bill, as believed by many, was not to stabilize the supply of gas but to enable gas pipeline firms to remove as much cheap Texas gas as possible and store it in new reservoirs in the north and east before Texans could realize its real value. As an indication of this, TIPRO pointed to the fact that no limitation was placed on the amount of Texas gas that may be stored in underground reservoirs in other states.

This concept of gas storage is entirely new to me. We have, however, been talking recently with representatives of the association and have arranged for a conference to see if they can be convinced that the bill is all right as it now stands, or to arrive at some amendment to the bill that would satisfy them and still accomplish the purpose for which it was designed.

So far as my companies are concerned, we have an eminent domain law in the state of Illinois and are perfectly happy with it, but I think for the good of the industry the industry should get behind S. 1000 and support it to its ultimate passage, because I believe that sooner or later a perfectly good storage project will be blocked if the right of eminent domain for the purpose is not secured.

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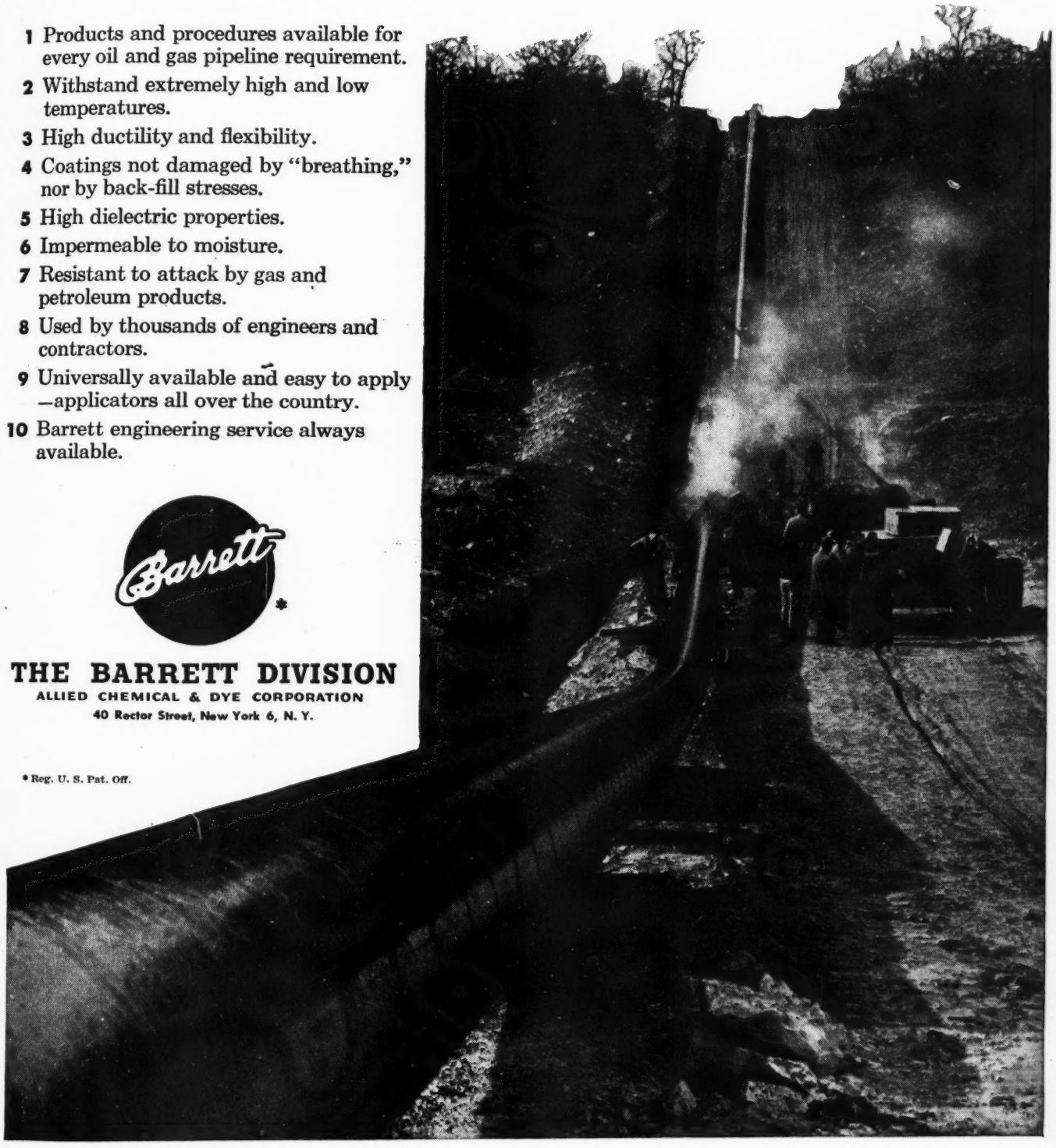

PIPELINE NEWS

FPC Okays Supply Line for Texas Gas; Denies Balance

Approval of a supply line to help Texas Gas Transmission Corp. bring its system up to capacity but denial of plans to amplify its service were contained in a decision handed down last month by the Federal Power Commission.

Under terms of the order, the Owensboro (Ky.) pipeline company was permitted to build a $14 million, 189-mile, 26-in. line from Acadia parish, La., to a connection with its existing line in Morehouse parish. The line will connect at its southern terminus with facilities of two Texas Gas subsidiaries, Texas Northern Gas Corp., and Louisiana Natural Gas Corp., which will deliver from southern Louisiana fields sufficient gas to fill the gap between 652.5 MMcf per day available to the company and the 705 MMcf designed capacity.

However, the commission, concerned with what it termed Texas Gas' failure to show that it has an adequate supply of gas to increase the system capacity, refused to issue a permit for construction of 405 miles of loop between Bastrop, La., and Hardinsburg, Ky., together with a new 3960-hp station near Shreveport and 17,260 hp in added capacity in other stations.

Texas Gas had planned to pick up an extra 200 MMcf—with an option to increase this to 275—from United Gas Pipe Line Co., Shreveport, but FPC denied United's application for permission to make the sales on the basis of the lack of facilities to make the proposed increased deliveries, together with deliveries proposed to other customers.

While the certificate for the 189-mile line was augmented by the authorization for direct sales of up to 6 MMcf per day on an interruptible basis to Mathieson Hydrocarbon Chemical Corp., Brandenburg, Ky., FPC's dismissal of the other plans set off a chain reaction of denials. Louisville Gas & Electric Co. was restrained from abandoning service to Indiana Gas & Water Co. for resale in New Albany, Jefferson, Clarksville and Claysburg, Ind., for which Texas Gas was planning to supply the gas direct to Indiana Gas. Texas Gas was turned down on its plan to sell up to 90 MMcf per day interruptibly to Tennessee Valley Authority for use as boiler fuel at Johnsonville, Tenn. FPC pointed out that the TVA steam generating plant had plenty of coal supplies available and the annual use of gas under the plan would be too high to be practicable.

Similarly, a request of Mississippi Power & Light Co. for an order directing Texas Gas to furnish up to 60 MMcf per day for boiler fuel at a proposed generating plant at Cleveland, Miss. was denied.

Cincinnati Gas & Electric Co.'s request for allocation of 1 MMcf per day for resale to the Atomic Energy Commission's new installation near Cincinnati was denied since the utility anticipated it would be able to provide service to the plant from other sources.

Sales to Mathieson were seen as a service vital to defense. The Brandenburg plant will produce about 90 million gals. of hydrocarbons and 93.5 million lb of chemicals per year. PAD and NSRB have declared these services strategically necessary to defense.

Much of the substance of the applications is likely to be incorporated in a new application. FPC left the door open, denying the applications "without prejudice" because of the obvious need for new and essential uses of gas in the Louisville-Cincinnati region.

Glacier Gas Co. Would Import Alberta Natural

A three-way request for (1) authority to import natural gas from Alberta, (2) authority to construct and operate a 626-mile pipeline system running from the Canadian border through Montana, Idaho, and Washington, and (3) a Presidential permit covering the importation was filed with FPC recently by Glacier Gas Co., a Montana Power Co. (Butte) subsidiary.

Intending to sell gas at wholesale and retail in the three states, the company would build a 20-in. mainline from the international boundary near Kalispell, Mont., running 285 miles to Spokane, Wash., with a 16-in. take-off extending 120 miles to Hanford, Wash., an 8-in. line extending from Spokane 91 miles to Lewiston, Idaho, and a 130-mile, 12¾-in. line traveling northwestward from Spokane to a point on the Canadian border south of Trail, B. C.

Gas would be bought at Pincher Creek field, in southwestern Alberta, which has reserves totaling 1170 billion, according to Glacier executives. Westcoast Transmission Co. Ltd., the purchaser, would sell to Glacier at an interconnection on the border, and would receive a certain percentage at the border terminus for distribution in British Columbia. Westcoast is seeking Alberta's permission to take up to 25 billion a year from Pincher Creek.

Production Step-up Result Of Columbia Gas Project

Stepped-up natural gas production will be realized from Maryland and West Virginia gas fields of the Columbia Gas System as the result of a temporary FPC authorization issued late in October for the construction of pipeline facilities in the two states and Pennsylvania.

Two Columbia subsidiaries are involved in the $2.2 million program—Cumberland & Allegheny Gas Co., which will build a 35-mile, 10-in. line from Mountain Lake Park, Md., to the Pennsylvania-West Virginia line in Monongalia county, W. Va., and Manufacturers Light & Heat Co., which will build 100 ft of line in Fayette county, Pa., to hook the Cumberland line to an existing line leading to Waynesburg, Pa.

Cumberland will also lay 11 miles of line in Garrett county, Md., and Preston county, W. Va., and will install 880- and 1200-hp stations in the respective counties.

The hearings for final authorization were scheduled to get under way at month's end, being combined with another application for an additional 11 miles of line which Cumberland would build in Maryland and West Virginia.

Central Kentucky Granted Okay for 13-Mile Line

Now that Columbia Gas System has partially rectified a tight winter gas supply situation, FPC has decided to let one of the companies the system supplies, Central Kentucky Natural Gas Co., proceed with the construction of a 13-mile line to increase deliveries to Cincinnati.

At a cost of $780,000, the 20-in. line, which will parallel the company's existing 14-in. line from North Means, Ky., to Cincinnati, will carry an extra 52 MMcf per day, bringing deliveries to the Ohio city to 333,100,000 on a peak day.

On Aug. 27 FPC had turned down the line on the basis that Central Kentucky lacked the necessary gas and that the facilities "might encourage an unwarranted load growth in that area beyond the company's ability to serve." But when Columbia made plans to boost its own system deliveries enough to reduce peak day shortages from 670 MMcf to 300.7 MMcf (a deficiency that can be made up out of interruptibles) FPC decided Central Kentucky's plan was sound.

Initial Decision Approves Iowa-Illinois Project

A $1 million, 41-mile line connecting with the main line of Natural Gas Pipeline Co. of America in Washington county, Iowa, and running northerly to Cedar Rapids will be built by Iowa-Illinois Gas & Electric Co.. under terms of an initial decision brought by FPC Examiner Emery J. Woodall recently. Increased deliveries by the Davenport utility to both Cedar Rapids and Iowa City are made possible by the project.

Paralleling an existing line, the new carrier would double the lateral capacity by bringing in 1540 Mcf per hour.

Under terms of the decision, a disclaimer of jurisdiction, sought by the company as an alternative to a certificate, was denied. Iowa-Illinois based its disclaimer request on the contention that the new line will perform "an identical transportation of interstate natural gas as the existing line does," but since a cancellation of the certificate for the existing line was not sought as a part of the petition the examiner decided that a disclaimer of jurisdiction over the new line would be out of the question.

Pipeliners to Hold Meet

Principal speaker at the fourth annual convention of the Pipe Line Contractors Assn., to be held Jan. 8 and 9 at the Shamrock in Houston, will be Gardiner Symonds, president of Tennessee Gas Transmission Co. More than 500 persons are expected at the meeting.

Active members include 43 pipeline contracting firms who have built practically all of the cross-country systems during the past few years. In addition, there are 64 associate members—firms engaged in subcontracting, equipment manufacturing, and equipment dealers and suppliers.

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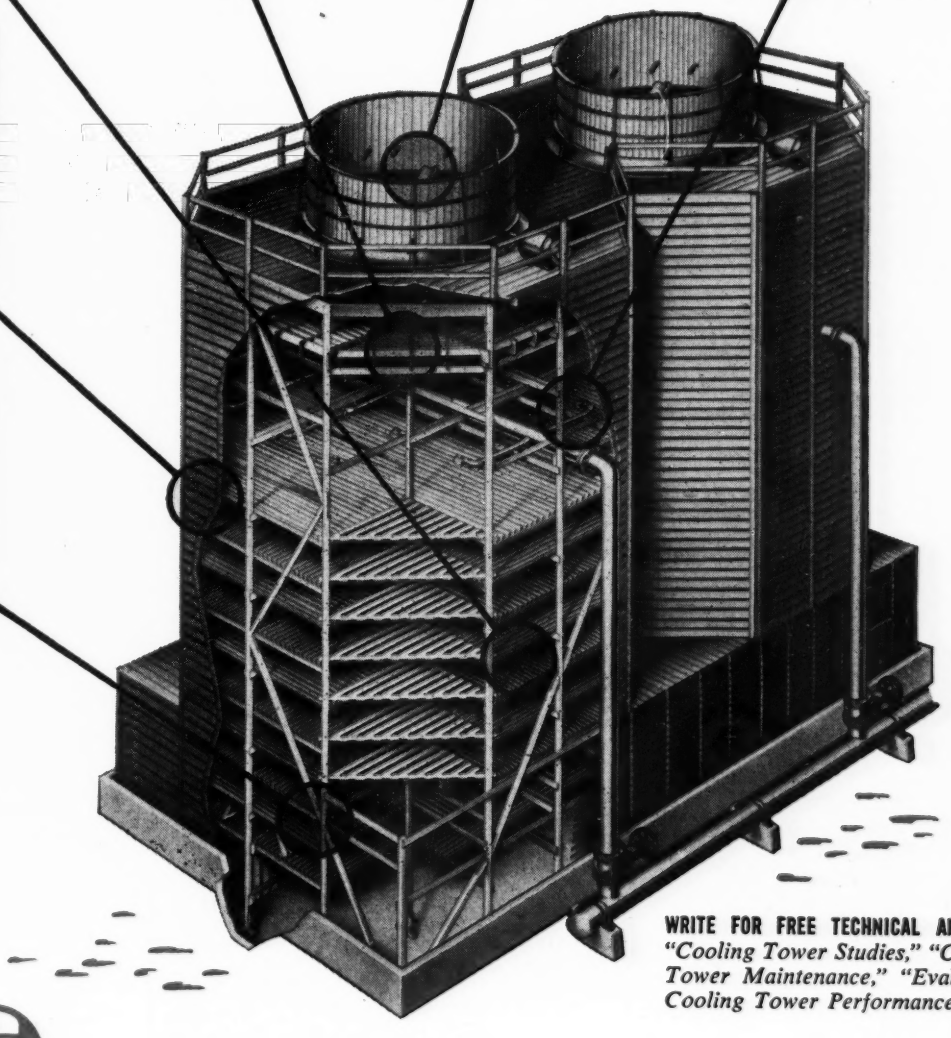
Rugged 4" x 4" posts with 4" x 4" and 3" x 4" bracing—Corrosion-proof bolted internal gusset plate structural joints take both tension and compression for extra safety under all conditions. Posts are on 6' centers. Columns and bracing are designed with forethought to future tower extension—panels are reusable on new extension—bracing and columns need no modification.



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Northeastern Completes Massachusetts Construction

Natural gas from Texas and Louisiana is now flowing into Massachusetts through Northeastern Gas Transmission Co.'s 290-mile network spanning the state as far as Boston. Early last month six utilities were already using natural and were in the process of converting appliances. They are Pittsfield Coal Gas Co., Springfield Gas Light, Worcester Gas Light, Holyoke Gas & Electric Dept., Westfield Gas & Electric, and Lowell Gas.

Lynn Gas & Electric Co. and Haverhill Gas Light Co. were scheduled to begin taking natural by mid-November. Northeastern was ready to begin deliveries to the other Massachusetts utilities it is authorized to serve, as soon as they are prepared to take it. These include Arlington Gas Light, Beverly Gas & Electric, Malden & Melrose Gas Light, Suburban Gas & Electric (Revere), Salem Gas Light, Lawrence Gas & Electric, Central Massachusetts Gas (Southbridge and Spencer), Northampton Gas Light, and Northern Berkshire Gas.

Springfield Gas Light Co. was the first utility to receive natural gas, which was turned into its system on Sept. 28. Holyoke Gas & Electric Dept., however, led the way in completing conversion of appliances, making its system the first in New England to use 100% natural gas.

Northeastern's 1951 construction program used a total of 40,000 tons of steel pipe. Six river crossings were completed and 18 meter stations were built. Next year's program will complete the construction authorized by FPC. This phase includes service to utilities in Connecticut and New Hampshire.

THE PIG WITH THE POKE — CLEANS PIPE LINES

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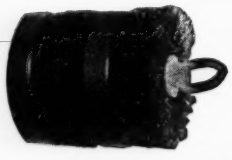
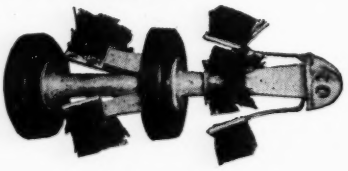
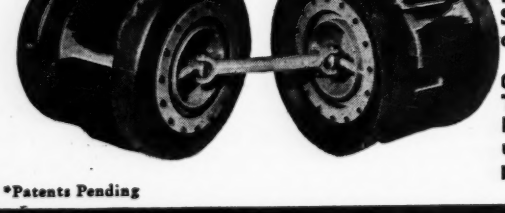


4" Size—TYPE JRN. 2" to 4" sizes. Will pass 1½ R-90° Bends. No valves other than full diameter thru port valves. Use TYPE SCN-51 for 6" size.



8" Size - TYPE WC-11. 8" to 14". Will traverse 6-foot radius field bends, full diameter side openings at 45°. SPRINGS COMPENSATE for BRUSH WEAR.

20" Size - TYPE GP-2. 16" to 30" 200-lb. SPRING forces the brushes against pipe wall — COMPENSATING for WEAR. Will traverse round opening gate or plug valves. SPRINGS and BRUSHES are identical and interchangeable for all types and sizes of GP-PIGS.



24" Size - GP-3. 18" to 30". Sizes will pass 1½ R-30° Bends. SPRINGS COMPENSATE for BRUSH WEAR ASSURING full section cleaning efficiency.

GP-3 consists of two Type GP-1 Pigs—Each Unit may be used as individual pig.

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Riverside Storage Plan Revealed by Michigan Gas

To accommodate additional natural gas deliveries from Panhandle Eastern Pipe Line Co., which in turn will be fed to Consumers Power Co., Jackson, Mich. this winter, Michigan Gas Storage Co. of Jackson is developing a new storage field.

The Riverside gas field, Missaukee county, and a 10-mile line and other facilities now owned by Consumers have been acquired by Michigan Gas, and the company has received FPC permission to build 125 miles of lines and add 7400 hp at its Muskegon river station to handle the transfers.

At a total cost of $10,866,000, including acquisition as well as construction, Michigan Gas will build 78 miles of 24-, 22-, and 16-in. line from Laingsburg Junction to a point near Pontiac and Mt. Clemens, with 17 miles of laterals into Consumers' southeast division and 30 miles of 26-in. loop between Laingsburg and Mt. Pleasant Junction.

Union Gas Completes Line For Importing U.S. Gas

Eastern Canada's largest pipeline job—61 miles of 16-in. from Windsor to Dawn—has been completed and is being used by Union Gas Co. of Canada, Chatham. It was built to provide needed capacity for importation of U. S. gas and to improve winter delivery to Union's customers.

The Canadian utility has importation lines under the Detroit river, connecting its system with that of Panhandle Eastern Pipe Line Co. During October, Panhandle stepped up its volume to Canada, and 30 MMcf per day poured through the new line into underground storage in Dawn township, Lambton county. The export permit allows deliveries from Panhandle during the summer only, with no gas being sent into Canada from November through March.

Shaw Construction Co., Sarnia, built the $2.5 million line.

Martinsville to Get Natural

A conditional approval of a plan whereby Southwestern Virginia Gas Transmission Co., Martinsville, will build a 17-mile line from a connection with Trancontinental Gas Pipe Line Corp.'s system just north of the North Carolina-Virginia state line to a terminus at Martinsville, was granted last month.

The line, which will cost $220,378, will deliver 500 Mcf per day to Southwestern's affiliate, Southwestern Virginia Gas Co., for distribution in Martinsville, which is now served with butane-air.

Since ownership and management of the two comapnies are practically identical, FPC thought the estimated cost of operation of the line was unreasonable, and demanded that new tariff be filed prior to start of operations.

El Paso Decision Affects Numerous Other Projects

The future of natural gas service on a broad geographical scale in the West and Southwest was directly affected by several FPC actions last month. The common denominator in all the decisions and announcements was El Paso Natural Gas Co., supplier for Texas, Arizona, New Mexico, and California.

An initial decision was filed by Samuel W. Jensch, Presiding examiner, which authorized two El Paso projects. One of the plans would make available to present customers in Texas, New Mexico, and Arizona an extra 100 MMcf per day. Involving the construction of 10.4 miles of 30-in. main line loop and 37,160 hp in new and existing stations, the project would cost $22,950,000. Certain other field and gathering facilities will be built in conjunction, but FPC found them outside its jurisdiction.

The other project will cost $1 million and will boost deliveries to Phoenix, Chandler City, and Mesa, Ariz. by 67 MMcf, bringing total capacity to 143 MMcf. These were temporarily authorized a year ago.

Soon after the decision was rendered, FPC began hearing other applications whereby Southern California Gas Co. and Pacific Gas & Electric Co. would build facilities to exchange gas in order to extend service. SoCal would build a 38-mile line extending from a connection with PG&E's line near Mojave, Calif., whence it would carry the gas (originating from El Paso's system) to Antelope valley for service to Rosamond, Mojave, Lancaster, and Palmdale. Deliveries would be on a sliding scale, starting at 141 MMcf per year and reaching 234 million in the fifth year.

In return, PG&E would take exchange gas from the Los Angeles company at its own Kettleman Hills compressor station.

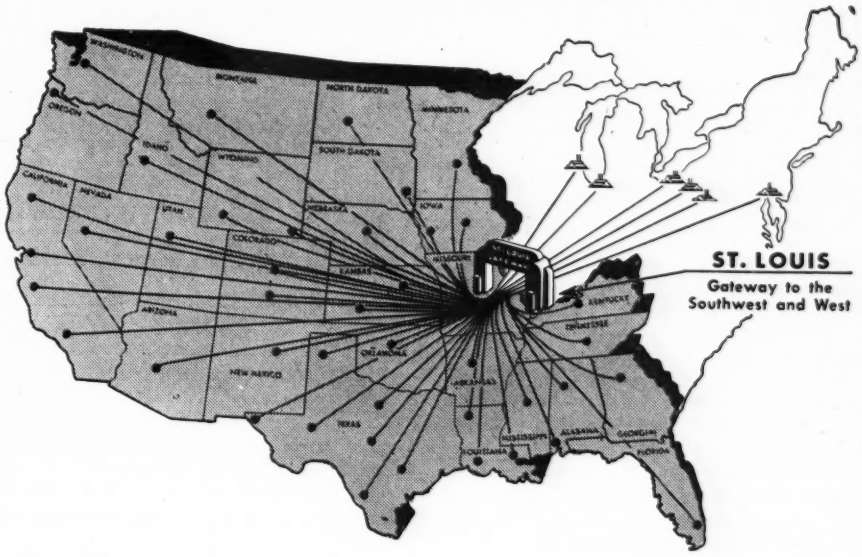
FPC set up for March 4 hearings on a consolidation of four applications of PG&E, El Paso, SoCal, and the latter's affiliate, Southern Counties Gas Co., involving the construction of facilities to carry an added 300 MMcf per day into California markets.

El Paso submitted two plans, one for delivery to the southern companies of 150 MMcf per day at the California-Arizona border, the other for delivery of like amounts to the San Francisco utility. The recipient companies are asking for extra facilities to take the deliveries. El Paso would spend $69,680,000, PG&E $19,391,000, and the Los Angeles companies $5,386,000.

In connection with the southern California plan, the two companies have filed an amendment to their application to avoid crossing public lands and force them into common carrier status. Originally seeking to spend $7,767,525 to build 87 miles of 30-in. line, they now plan to construct 45 miles of loops along the route of the mainline from the Arizona border to Los Angeles.

PAD Gives Priority Aid

Twelve major natural gas pipeline projects and a number of smaller ones have been given fourth quarter priorities assistance by PAD. Construction cost of the 12 projects is



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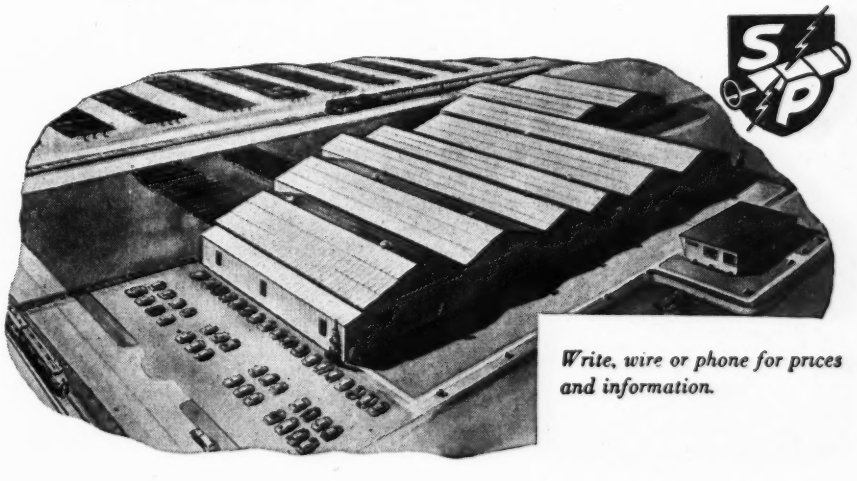

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estimated at $553,626,000.

Of the 915,460 tons of steel line pipe required for completion of the major projects, 278,360 tons have been allotted during the fourth quarter. In addition, 182,469 tons have been allotted for gathering lines, distribution lines, and other smaller gas projects, making total line pipe allocations of 460,829 during the quarter.

New York State Expands

Four loops and a line replacement, aggregating 104.7 miles, and additions of 2420 hp at compressor stations are embodied in an application filed before FPC Oct. 31 by New York State Natural Gas Corp., New York City.

Costing $6 million, the facilities would boost deliveries to New York's customers. The lines would run through four Pennsylvania and three New York counties, and the compressors would go into stations in Pennsylvania.

Final FPC Okay for Line

Having directed Panhandle Eastern Pipe Line Co. to deliver 5 MMcf per day to Michigan Gas Utilities Co. at a proposed point of interconnection at Marshall, Mich., FPC in late October gave final authorization to the Michigan company's plan to build a 77-mile line to take the gas.

With an ultimate daily capacity of 11.2 MMcf, the $1.5 million line will introduce natural to nine Michigan communities. Bronson, Tekonsha, Union City, Jonesville, and Burr Oak will receive natural gas for the first time, as will Coldwater, Hillsdale, Sturgis, and Quincy, the latter four of which now have propane-air systems.

The company originally filed its application under the old name of National Utilities Co. of Michigan.

TGT Withdraws Application For Canadian Project

Fast-growing Tennessee Gas Transmission Co., Houston, which had entertained plans for stretching its system from Buffalo on to the Canadian border at Niagara Falls and selling 115 MMcf there for distribution in that country, last month decided it was overextending itself and asked the FPC to drop its application.

TGT, which was all ready to sink $47 million into the project, requested that withdrawal of the application be approved without prejudice, leaving the way clear for another filing at a later date when it might be better prepared to submit the exhibits required under FPC regulations.

Recipient of the gas at the border was to have been Niagara Gas Transmission Ltd., a newly formed Ontario corporation controlled by Consumers Gas Co., Toronto.

New Kansas Storage Fields

In order to increase its maximum daily delivery by approximately 120 MMcf per day, Cities Service Gas Co., Oklahoma City, is going to develop two depleted fields in Kansas for the underground storage of gas.

FPC late in October gave its approval to the plan, which will cost nearly $3.5 million. The fields themselves will take more than $3 million of this, while the replacement of 10 miles of double 16-in. lines with a single 26-in. line between the Welda and Ottawa (Kan.) compressor stations will take another $419,000.

More firm service for Kansas City and greater system flexibility are expected to result. The Colony field is expected to be ready for operation for the 1952-53 winter, with McLouth field scheduled for discharge the following year.

Western Virginia Gas Find

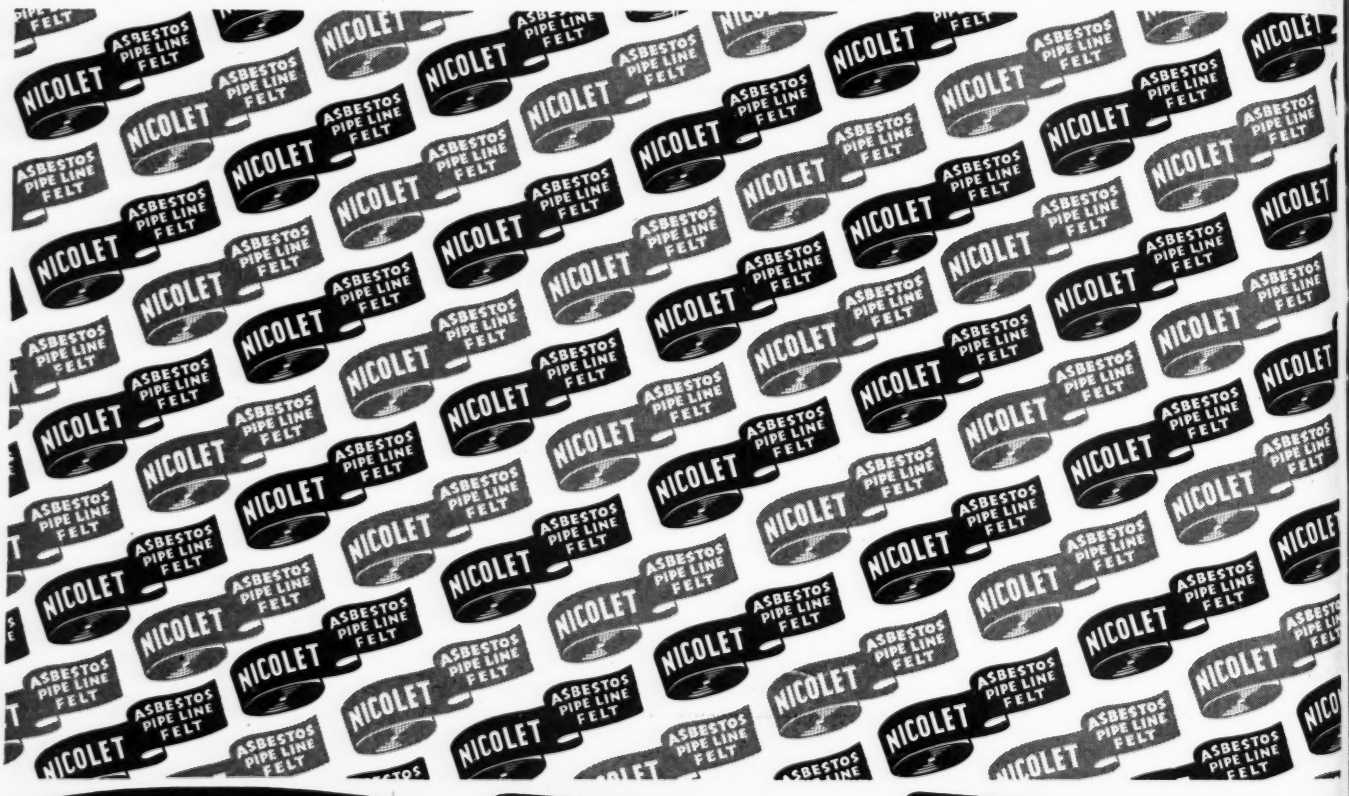
Geologists of United Fuel Gas Co. believe there is good possibility for commercial production of natural gas in Rockingham county, western Virginia.

The estimate was based on activity at a well at Bergton near the Virginia-West Virginia border. The well had produced an average of 1043 Mcf every 24 hours, the company reported. A second drill in the area was being contemplated.

The only commercial gas wells in Virginia at present are in the extreme southwest area.

Pipeline Newsnotes

Ray C. Fish, of Fish Constructors Inc., Houston, recently announced his purchase of Spokane (Wash.) Gas & Fuel Co. Mr. Fish said purchase of the utility was conditional, pending SEC approval. The Houston firm reportedly plans to build a pipeline



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from New Mexico to serve the Pacific Northwest with natural gas.

Hearings were due to start Dec. 3 before FPC in Washington on a project of Colorado Interstate Gas Co., Colorado Springs, to increase the capacity of its new 216-mile Texas-to-Colorado line to meet anticipated needs of Rocky Mountain area customers. Colorado wants to spend $3.5 million to add loops and laterals and additional compressor horsepower on the line.

Final authorization backing up a temporary certificate issued the previous month was granted by FPC Oct. 19 to Union Gas & Electric Co., Bloomington, Ill., for a 33-mile 8-in. line. Hooking to facilities of Texas-Illinois' line in Piatt county, the $892,136 line will extend to Union's Bloomington plant. Bloomington, Farmer City, Normal, Le Roy, and Downs will receive service from the line.

A branch sales office at 3415 W. 8th St., Los Angeles, has been opened by Glass Fibers Inc., Toledo. John T. Podorean is branch sales engineer. The office will serve customers in California, Oregon, Washington, Nevada, Arizona, Utah, and Idaho.

First deliveries of natural gas from the Leidy field in Clinton county, Pa., last month started flowing into the system of Manufacturers Light & Heat Co., Pittsburgh, through the firm's $11 million, 167-mile line. The field has an open flow of 595,943 Mcf a day from 55 producing wells. Forty-eight other wells are being drilled and 14 additional locations have been selected.

PROGRESS REPORTS

Planned

AMERE GAS UTILITIES CO., Charleston, W. Va. Docket G-1716 for 33.6 miles of line in West Virginia.

ARKANSAS-MISSOURI POWER CO., Blytheville, Ark. To build line from Big Inch to serve 12 towns in two states. Construction scheduled for 1952.

CENTRAL WEST UTILITY CO., Kansas City, Docket G-1682, four alternate plans to serve Clay county, Mo.

CHICAGO DISTRICT PIPELINE CO., Joliet, Docket G-1756 to build 15 mile, 30-in. line in Cook county, Ill.

EAST TENNESSEE NATURAL GAS CO., Knoxville. Docket G-1336 for a 100-mile, 16-in. line from near Knoxville to Kingsport, Tenn. with appurtenant equipment.

EL PASO NATURAL GAS CO. Docket G-1631 for 112.9 miles 30-in., 179.5 miles field lines, 98,200 hp added capacity plus 36,540 hp in field stations, field gathering systems, and miscellaneous facilities.

EL PASO NATURAL GAS CO. Docket G-1630 for 25,050 hp at new and existing stations, 50.9 miles field lines, 2700 hp at a field plant, gas wells and miscellaneous facilities.

GLACIER GAS CO., Butte, Mont. Dockets G-1816, G-1817, G-1818 for 285 miles of 20-in. from northeast of Kalispell, Mont. to Spokane, Wash.; 91 miles of 8⅝-in. from Spokane to Lewiston, Idaho; 120 miles of 16-in. from Spokane to Hanford, Wash.; 130 miles of 12¾-in. from Spokane to south of Trail, B. C.

GULF-MICHIGAN GAS TRANSMISSION CORP., St. Louis, for 680-mile, 30-in. line from Perryville, La. to St. John, Ind. with three compressor stations totaling 30,800 hp.

MICHIGAN CONSOLIDATED GAS CO., 130-mile, 24-in. line paralleling present line from Austin storage field near Big Rapids, Mich. to Detroit.

MIDSOUTH GAS CO., Little Rock, Ark. Dockets G-1445 and 1680 for 240 miles of line in Greene, Crittenden, St. Francis, Lee, Phillips, Monroe, Woodruff, Poinsett, and Cross counties, Ark.

MISSOURI CENTRAL NATURAL GAS CO., Macon, Mo. Docket G-1509 for 25 miles of 6-in. from Moberly to Macon, Mo.

MONTANA POWER CO., Butte, to O'Connor Construction Co. for 23 miles of 6-in. and 15 miles of 8-in. from Hart Mountain field, Wyo., to Warren, Mont., and convert an 8-in. oil line from Warren to Billings, Mont.

NATURAL GAS STORAGE CO. OF ILLINOIS, Chicago. To build facilities to develop an underground storage area 15 miles from Kankakee, Ill.

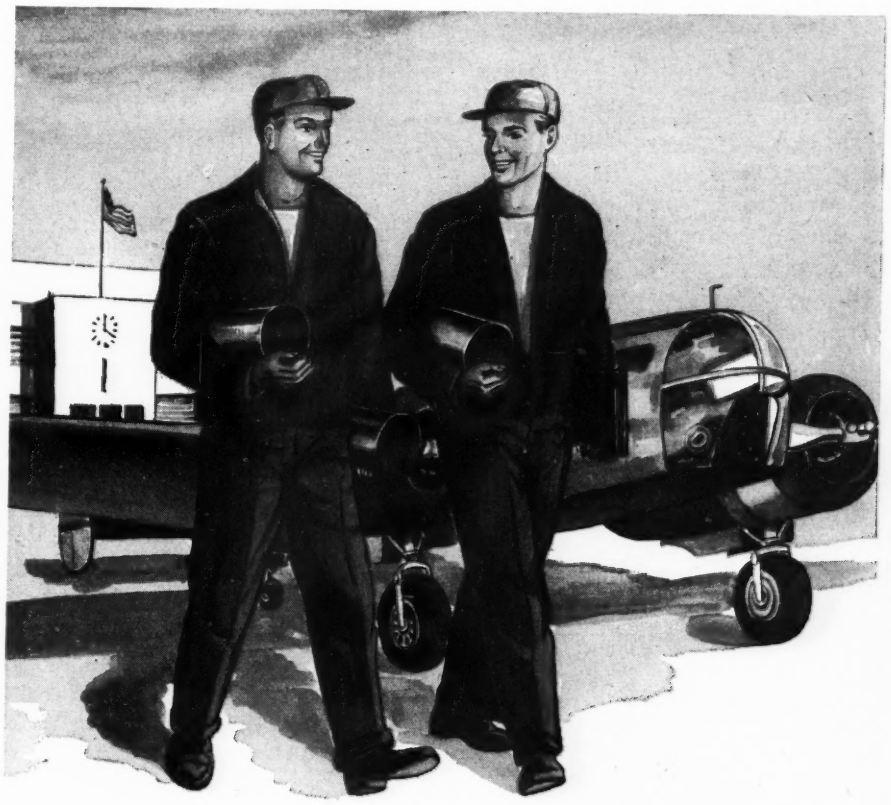
NEW RIVER GAS CO., Radford, Va., 50-mile line from Atlantic Seaboard's system in W. Va. to a point near Radford with laterals to four towns.

NEW YORK STATE NATURAL GAS CORP., Pittsburgh. Docket G-1824 for 104.7 miles of line in Pennsylvania and New York and installation of an additional 2420 hp at two existing compressor stations in Westmoreland and Tioga counties, Pa.

NORTHERN NATURAL GAS CO., Omaha. Dockets G-1442 and G-1511 for 13.9 miles of branch and a measuring and regulating station near Humboldt, Iowa and 1.5 miles of branch and a similar station near La Platte, Neb.

NORTHWEST NATURAL GAS CO., for 700 miles in Washington, Idaho, Oregon.

PACIFIC GAS & ELECTRIC CO., San Francisco. Docket G-1651 for 141 miles 34-in. loop and



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22,780 hp at authorized stations.

PACIFIC NORTHWEST PIPELINE CORP., 2175 miles of 26-in. from southern Texas to Seattle, Wash., Vancouver, B. C., via Oklahoma, Kansas, Colorado, Wyoming, Idaho, Oregon, Washington.

PIEDMONT GAS CO. INC., Hickory, N. C. Docket G-1617 for 28 miles 6-in. line.

POTOMAC GAS CO., Washington, D. C. Docket G-1768 for 14,000 ft of natural gas pipeline in Arlington county, Va.

ROCKLAND LIGHT & POWER CO., Nyack, N. Y. Docket G-1728 for 22 miles transmission line between Orangetown and Tomkins Cove, N. Y.

SHENANDOAH GAS CO., Lynchburg, Va., for 59 miles from near Cedarville, Va., to cities in Virginia and West Virginia.

SOUTHERN CALIFORNIA GAS CO., Los Angeles. Docket G-1698 for a 35-mile line in the Antelope valley, Calif.

SOUTHERN CALIFORNIA GAS CO. and SOUTHERN COUNTIES GAS CO., Los Angeles. Docket G-1718 for 45 miles 30-in. line between Whitewater and Desert Center, Calif., 6 miles 30-in. from Blythe, Calif. station to Calif.-Ariz. border, and two 1760-hp compressors at Blythe.

SOUTHERN NATURAL GAS CO., Birmingham, 127 miles of various size pipeline and two compressor stations totaling 11,050 hp in Alabama, Georgia, Mississippi and Louisiana.

TENNESSEE GAS TRANSMISSION CO., Houston, 521 miles loop line along present system; including 420 miles 30-in. in Texas, Louisiana, Arkansas, Mississippi, Tennessee & Kentucky, and 100 miles 26-in. in Kentucky and Ohio.

TEXAS-OHIO GAS CO., Houston. Docket G-1810 for 1350 miles 30-in. from Hidalgo county, Texas through Arkansas, Mississippi, Tennessee and Kentucky terminating near Spencer, W. Va. including 13 compressor stations totaling 140,000 hp.

TRANS-CANADA PIPE LINES LTD., for 2200-mile line from Alberta to major cities as far east as Montreal.

UTAH NATURAL GAS CO. to build a 360-mile line from the San Juan basin to Salt Lake City. A secondary line would run from Last Chance field (Wayne county, Utah) through Sevier and Sanpete counties.

UTAH PIPE LINE CO., Dallas, for a 392-mile line from Aztec, N. M. to Salt Lake City. Includes 374 miles of 22-in. and 18 miles of 16-in.

WESTCOAST TRANSMISSION CO. INC., Wilmington, Del., 615 miles, including 277 miles from Sumas, Wash. to Portland, Ore. with short branches to a number of cities in the two states; 266 miles south from the Osoyoos, B. C. area to Spokane and Hanford, Wash.; and 72 miles of laterals and 13 measuring stations.

Approved

CITIES SERVICE GAS CO., Oklahoma City. Docket G-1704 for a 10-mile, 26-in. line between its Welda and Ottawa stations in Franklin county, Kan.

CUMBERLAND & ALLEGHENY GAS CO., Pittsburgh. Docket G-1773 for 35 miles 10-in. from Mountain Lake park, Md. to Monongalia county, W. Va.; 11 miles in various sections of Preston county, W. Va. and Garrett county, Md.; 800-hp and 1200-hp stations in Garrett county, and 1200-hp station in Preston county.

EL PASO NATURAL GAS CO. Docket G-1629 for 10.4 miles 30-in., 36 miles field lines, 37,160 hp in main line stations, 18,910 hp in field stations, field gathering systems, and miscellaneous facilities.

IOWA-ILLINOIS GAS & ELECTRIC CO., Davenport. Docket G-1721 for a 41-mile, 10-in. line from Washington county to Cedar Rapids, Iowa.

SOUTHWESTERN VIRGINIA GAS TRANSMISSION CO., Martinsville. Docket G-2237 for 17-mile line from Transco's line near N.C.-Va. state line to Martinsville.

Under Way

ALGONQUIN GAS TRANSMISSION CO., Boston, facilities to serve designated companies in Mass., R. I., Conn., and N. J. Includes 253 miles of main line and 279 miles of laterals.

CANADIAN-MONTANA PIPELINE CO., Calgary, has Canadian Pipeline Construction Co. Ltd. at work on 18 miles of 16-in. line from Pakowki lake area in Alberta to Montana state line; 2 miles of 12-in., 12 miles of 10-in., 11 miles of 6-in. and 24 miles of 4-in. line for gathering.

CENTRAL KENTUCKY NATURAL GAS CO., Charleston, Docket G-1648. L. R. Young Construction Co. at work on 13 miles 20-in. loop northeast from North Means, Ky.

CITIES SERVICE GAS CO., Oklahoma City, at work on 56 miles of 16-, 10-, and 3-in. line in Kansas and 13,080 hp at new and old stations.

COLORADO - WYOMING GAS CO., Denver. Docket G-1534 has company forces at work on lateral lines and meter stations to supply gas to Public Service Co. of Colorado, its parent; add 2400 hp at its Mesa compressor station; replace 1½ miles of its Fort Warren lateral with larger pipe; and replace 4 miles of 4-in. (Golden lateral) with 8-in.

CUMBERLAND & ALLEGHENY GAS CO., Pittsburgh. Docket G-1732 to build 13 miles of line in various localities, and to retire the same amount in West Virginia and Maryland.

EAST OHIO GAS CO., Cleveland. Docket G-1571. Williams Bros. at work on a 65-mile, 26-in. line from near Petersburg, Ohio, to west of Twinsburg, Ohio. Completion scheduled for Dec. 15.

EL PASO NATURAL GAS CO. Dockets No. G-1729 and G-1730 constructing a 1980-hp com-

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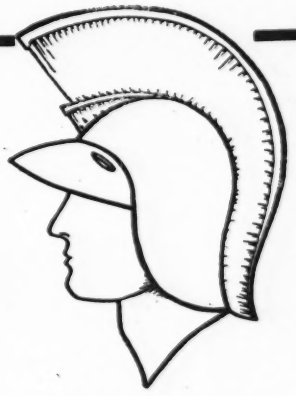

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EXECUTIVES of Northeastern Gas Transmission Co. and Springfield (Mass.) Gas Light Co. turn the valve which begins the first flow of natural gas into New England. They are, from left, Robert M. Brigham, executive secretary, Springfield; E. E. Miller and W. C. Norman, Northeastern vice president and president; R. W. O'Connor and F. H. Faulstich, Springfield general superintendent and assistant general manager; Howard S. Gray and R. C. O'Hare, measurement superintendent and vice president, Northeastern.

pressor station near TXL plant in Ector county, Texas.

HOME GAS CO., Pittsburgh. Docket G-1732 to build 16 miles paralleling an existing line in Steuben and Chemung counties, N. Y.

MANUFACTURERS LIGHT & HEAT CO., Pittsburgh. Docket G-1732 to build 26 miles of line, in various localities, retire 18 miles and a 125-hp station, and convert 3 miles transmission line to distribution in Pennsylvania and West Virginia.

MICHIGAN GAS STORAGE CO., Jackson, has Mahoney Contracting Co. at work on 78 miles of 16-, 22-, and 24-in. line from Laingsburg Junction to near Pontiac-Mt. Clemens, 3 laterals.

MICHIGAN GAS UTILITIES CO., Coldwater, Mich. (formerly National Utilities Co. of Michigan). Docket G-1625. Somerville Construction Co. at work on 77 miles in south central Michigan.

NEW YORK STATE NATURAL GAS CORP., Pittsburgh, Docket G-1701 for a 6600-hp station at Ithaca, N. Y. and 35.2 miles 20-in. loop from there to the Therm City station.

NEW YORK STATE NATURAL GAS CORP., Pittsburgh. Docket G-1601. Williams Bros. Co. at work on a 77-mile, 20-in. line from Lawrence county, Pa. to the South Bend storage area, 17 miles of field lines, and a 12,000-hp station. Fish Engineering Co. is building the station.

NORTHEASTERN GAS TRANSMISSION CO., Springfield, Mass. 500 miles of line from Tennessee Gas Transmission Co.'s system near Pittsfield, Mass. and from Transcontinental's system near Greenwich, Conn. with metering and regulating facilities to serve companies in Conn., Mass., and N. H. 290 miles from Mass.-N. Y. state line to Boston, Mass. and 18 meter stations in Mass. completed. 1952 construction plans include 100 miles 16-in. from Greenwich, Conn. to Springfield, Mass.; 23 miles 4-in. from Granville, Mass. to Torrington, Conn.; 26 miles 6-in. from Framingham to Fitchburg, Mass.; 45 miles of 8-, and 4-in. from Lowell, Mass. to Concord, N. H. and 15 meter stations.

NORTHERN NATURAL GAS CO., Omaha, has H. B. Zachry Co. at work adding to compressor stations at Bushton, Mullinville, and Clifton, Kan.

OHIO FUEL GAS CO., Columbus, Docket G-1639 for 61.3 miles in Sandusky, Elyria, and Dayton, Ohio areas. H. L. Gentry at work on 26 miles of 20-in. from Wellington to Elyria, Ohio and Sheehan Pipe Line Construction Co. building 25 miles of 20-in. near Xenia, Ohio.

PACIFIC GAS & ELECTRIC CO., San Francisco. Docket G-1709 for a 44-mile, 8⅝-in. line in Monterey county, Calif.

PACIFIC GAS & ELECTRIC CO., San Francisco, has Bechtel Corp. building compressor stations at Topock, 6 compressors totaling 15,000 hp; Hinkley, 7 compressors totaling 17,500 hp; and Kettleman Hills, 8 compressors totaling 12,320.

PUBLIC SERVICE CO. of N. C. INC., Gastonia. Docket G-1407 for 25 distribution systems in North Carolina.

TEXAS EASTERN TRANSMISSION CORP., Shreveport, to boost capacity to 1205 MMcf, 791 miles 30-in. from Kosciusko, Miss., to Connellsville, Pa.; seven compressor stations with 46,400 hp on new line, six with 52,500 hp on existing line; short lines in New York area. Williams Brothers-Davis Co. is at work on 163.6 miles of 30-in. line from Kosciusko, Miss., to the Tennessee river, and river crossing of Ohio river on Ohio-W. Va. border, to complete by Jan. 1, 1952.

TEXAS GAS TRANSMISSION CORP., Owensboro. Docket 1578. Houston Contracting Co. at work on 189 miles of 26-in. from Arcadia parish to Morehouse parish, La., 85% completed.

UNION GAS & ELECTRIC CO., Bloomington, Ind. Docket G-1778. Contracting and Material Co. at work on 33 mile 8-in. line from Piatt county, Ill. to Bloomington, with appurtenant equipment.

UNITED FUEL GAS CO., Charleston, to build 45 miles in West Virginia, 2640-hp compressor station with dehydration plant, and transfer 1000-hp unit from Walgrove to Kanawha station. H. L. Gentry Construction Co. has contract for 32 miles of 20-in. line near Charleston, W. Va.

UNITED GAS PIPE LINE CO., Shreveport, River Construction Corp. at work on 93.7 miles of 26-, 24-, and 20-in. from a point near Houston to near Orange, Texas, and 86.1 miles of 30-in. from Refugio county to near Wharton county, Texas, including a multiple river crossing of the Guadalupe River. Contracts have been awarded to Gulf Southern Contractors for 1017 miles of 8⅝-, to 30-in. line in Texas, Louisiana and Mississippi; Brown & Root for engineering and construction work on 8 compressor stations and 9 dehydration plants in the Gulf of Mexico off the shore of Louisiana, and to Pittsburgh-Des Moines Steel Co. for suspension crossings over the Colorado, Brazos and Red rivers.

Contracts Let

TEXAS EASTERN TRANSMISSION CORP., Shreveport, to Anderson Bros. Corp. for 217 miles 30-in. from near Portsmouth, Ohio to near Connellsville, Pa.

WESTERN GAS CO., Butte, has Engineers Ltd. Pipe Line Co. at work on 53 miles of 16-in. line from Canadian border to Cut Bank, Mont.

Pending Construction

GRAND VALLEY PIPELINE CO., Denver, a 105-mile, 8- and 10-in. line from Piceance creek to Grand Junction and Rifle, Colo.

KANSAS-NEBRASKA NATURAL GAS CO., Hastings. To build in Nebraska 20 miles of 6⅝-in. and 19 miles of 4½-in. from Neligh to O'Neill; 22 miles of 6⅝-in. and 34½ miles of 4½-in. from Neligh to Hartington; 52 miles of 3½-in. and 28½ miles of 2⅜-in. laterals.

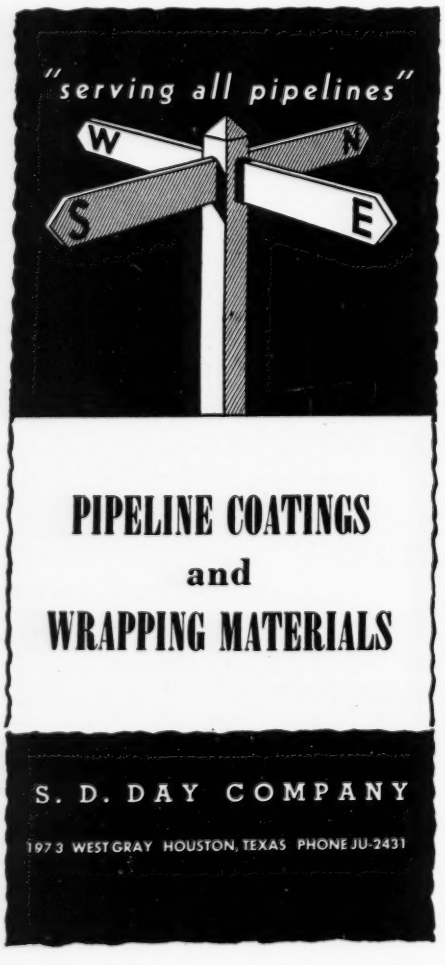
LAKE SHORE PIPE LINE CO., Cleveland, Ohio, 45-mile, 10¾-in. line from Meadville, Pa. to Ashtabula, Ohio. Work to begin in 1952.

MISSISSIPPI RIVER FUEL CORP., St. Louis. Docket G-1581 for development of Waterloo, Ill. storage field, 16.2 miles of line, an 1800-hp station, and other facilities.

NEW YORK STATE NATURAL GAS CORP., Pittsburgh, to Pipe Line Construction & Drilling Co. for 23½ miles of 16- and 20-in. line from Preston station near Waynesburg, Pa. to Colvin Gate, Washington county, Pa., and 4½ miles of 20-in. from Murrysville Gate to Tonkin pump station, Westmoreland county, Pa.

NIAGARA MOHAWK POWER CORP., Syracuse, under Docket G-1475, a 55-mile 10¾-in. line to supply Watertown and other communities.

UNITED GAS PIPE LINE CO., Shreveport, 39 miles 16-in. from Baldwin county, Ala., to Escambia county, Fla.; two laterals to Saufley field. Also tap and sales meter stations.



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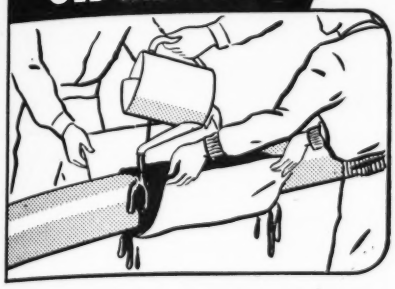

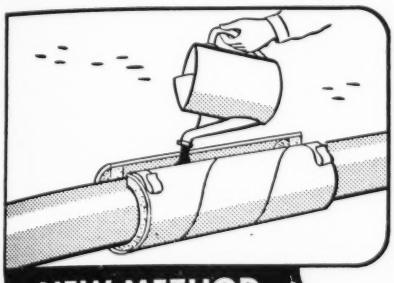

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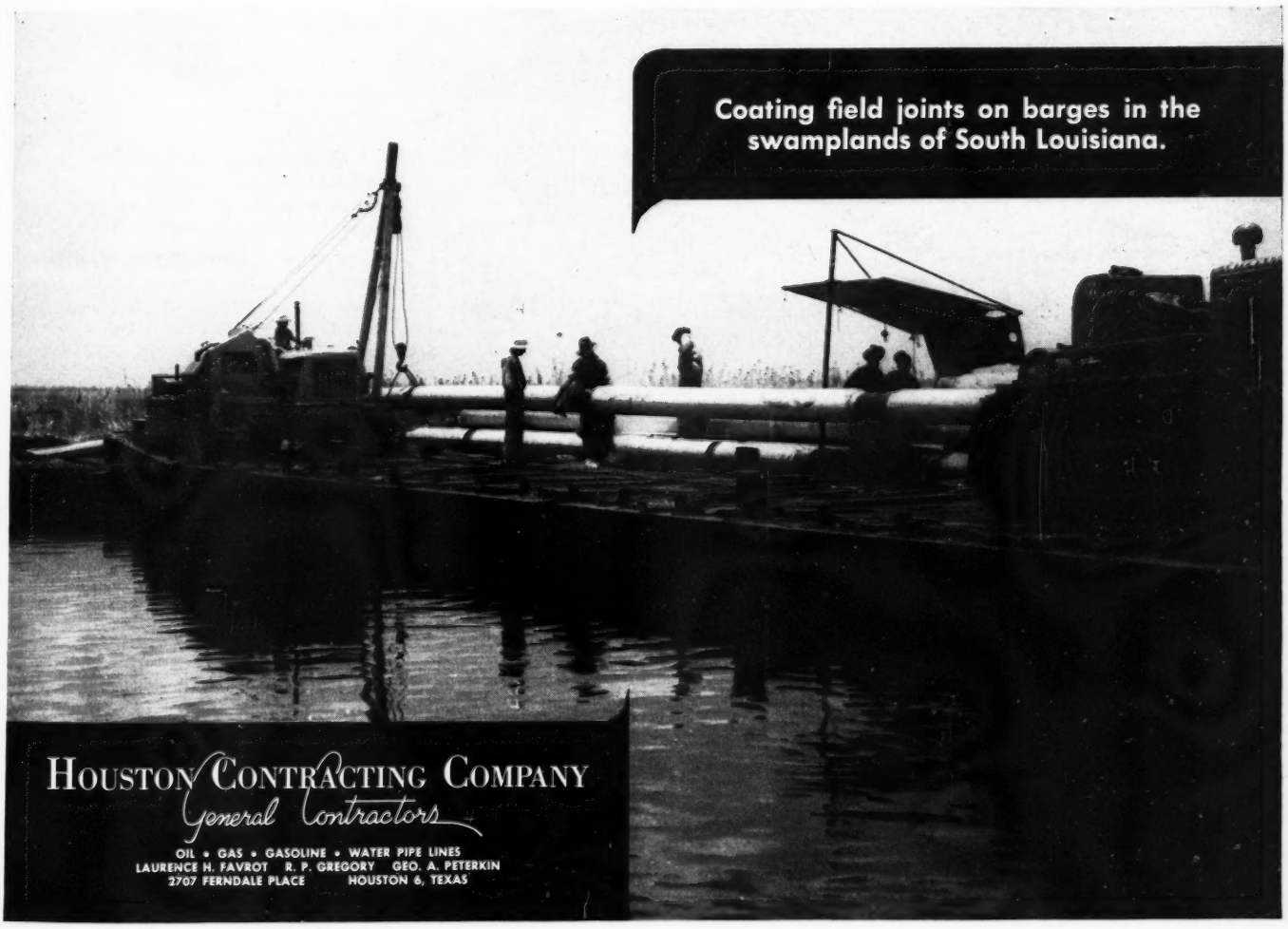

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PIPELINE PEOPLE

A. G. Van Campen

Recent promotions at Clark Bros. Co. Inc., Olean, N. Y., include the appointments of A. G. VAN CAMPEN as sales manager of the Tulsa-Midcontinent territory, ROBERT C. SMITH as Chicago district sales manager, and M. G. DANIELS as industrial sales engineer in the Chicago office. Mr. Van Campen, formerly district sales manager in Chicago, succeeds G. W. PROBST, new western regional sales manager.

Worthington Pump & Machinery Corp., Harrison, N. J., has named six plant executives to new posts. They are GEORGE P. PASSMORE as assistant to the vice president in charge of manufacturing, JOHN BURLICK as assistant works manager in charge of industrial engineering, MAX A. HEYMAN as works manager in charge of production control, W. D. SIZER as manager of regional engineering and service department, GEORGE F. HABACH as executive engineer, and EVERETT SCHMACHTENBERG as chief engineer of the centrifugal engineering division.

DONALD L. BARGER has been appointed assistant superintendent of production and transmission for New York State Natural Gas Corp., Pittsburgh. Mr. Barger has been associated with Peoples Natural Gas Co., also of Pittsburgh, since 1935 and has served as junior civil engineer, assistant superintendent and superintendent of the Armstrong district. WILLIAM A. BOYD has been appointed head of New York State Natural's gas measurement accounting department, and RAYMOND C. YECKLEY has been promoted to assistant head of a similar department for Peoples Natural.

JOHN W. HENDRICKSON has been appointed technical assistant to the superintendent of production and transmission for New York State Natural Gas Corp. Mr. Hendrickson has been associated with the geological departments of New York State Natural and Peoples Natural Gas Co. for several years.

New chief engineer of C. E. Wilson Construction Co., of Houston and Kansas City, is P. E. BUSCH. For the past two years Mr. Busch has been assistant superintendent of measurement for Texas Eastern Transmission Corp., Shreveport, and prior to that was chief corrosion engineer for the Great Lakes Pipeline Co. at Kansas City.

Three new vice presidents and a new treasurer have been elected by the directors of Tennessee Gas Transmission Co., Houston. W. C. MCGEE JR., general superintendent of the company's pipeline system, was made vice president and general superintendent; JOE KING, formerly chief engineer, was elevated to the post of vice president in charge of engineering; CHARLES MYERS, former treasurer, was named vice president in charge of the company's commerce building and insurance, and CECIL C. JOHNSON, former controller, was elected treasurer.

GAS

Baltimore's First Year With Natural Gas . . 31
How to Reduce Noise at Regulator Stations . . 91

ENGINEERING • UTILIZATION • PIPELINES • MANAGEMENT

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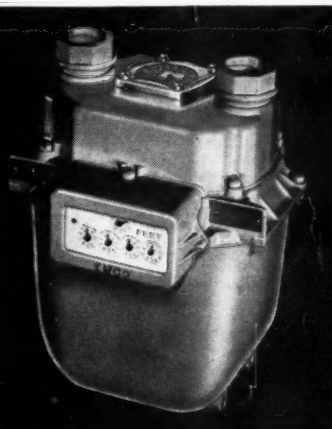
Rockwell Domestic Gas Meters



No. 0, 1 and 2 METERS

For natural, manufactured and LP-gas. Three sizes to provide accurate dependable measurement for domestic and commercial loads. No. 0 capacity 175 cfh*, No. 1 capacity 275 cfh*, No. 2 capacity 415 cfh*.

Cash registers for gas utilities

Gas meters are your silent representatives on the consumers' premises. They alone determine the measure of your revenue. In metering, the necessity for the highest degree of accuracy is obvious. And, as an adjunct to operating economy, gas meters should be easy to repair.

For many years the basic construction of Rockwell-Emco meters has enjoyed wide acceptance. Their accuracy and dependability have been proved by time; their low servicing costs are a matter of record.

Today's Rockwell meters have vastly improved measuring mechanisms. Many design refinements result in longer sustained accuracy; a greatly extended useful life. Now, more than ever before Rockwell offers the best measurement values you can buy. Write for bulletin 1083.

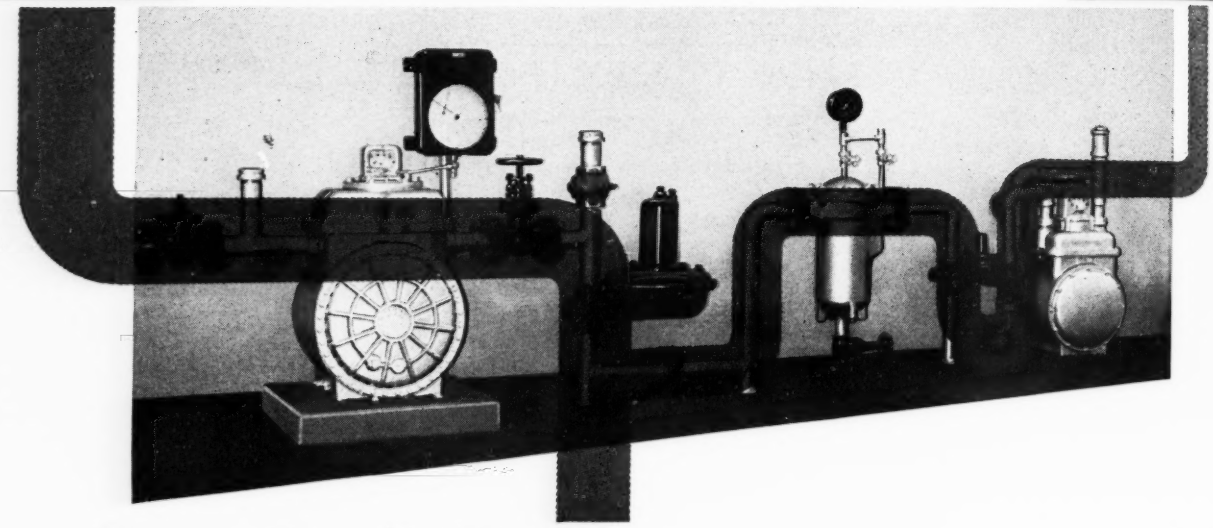
ROCKWELL

ROCKWELL MANUFACTURING COMPANY
Pittsburgh 8, Pa.

Atlanta Boston Chicago Columbus Houston Kansas City
Los Angeles New York Pittsburgh San Francisco
Seattle Tulsa

HIGH PRESSURE

LOW PRESSURE



Constant Balance

through precision gas regulation

Reliance Regulators maintain round the clock control of gas pressure in this installation.

From a single high pressure source of gas two different pressures are used in this plant. Millions of B.T.U.s are needed for furnaces where only thousands are needed for hot water heaters and laboratory use.

Natural gas is supplied at two fixed pressures throughout the plant, regardless of the variable volumetric demand at different times of the day. Reliance Regulators maintain a *constant balance* of these required pressures in each line before the gas is metered through separate meters.

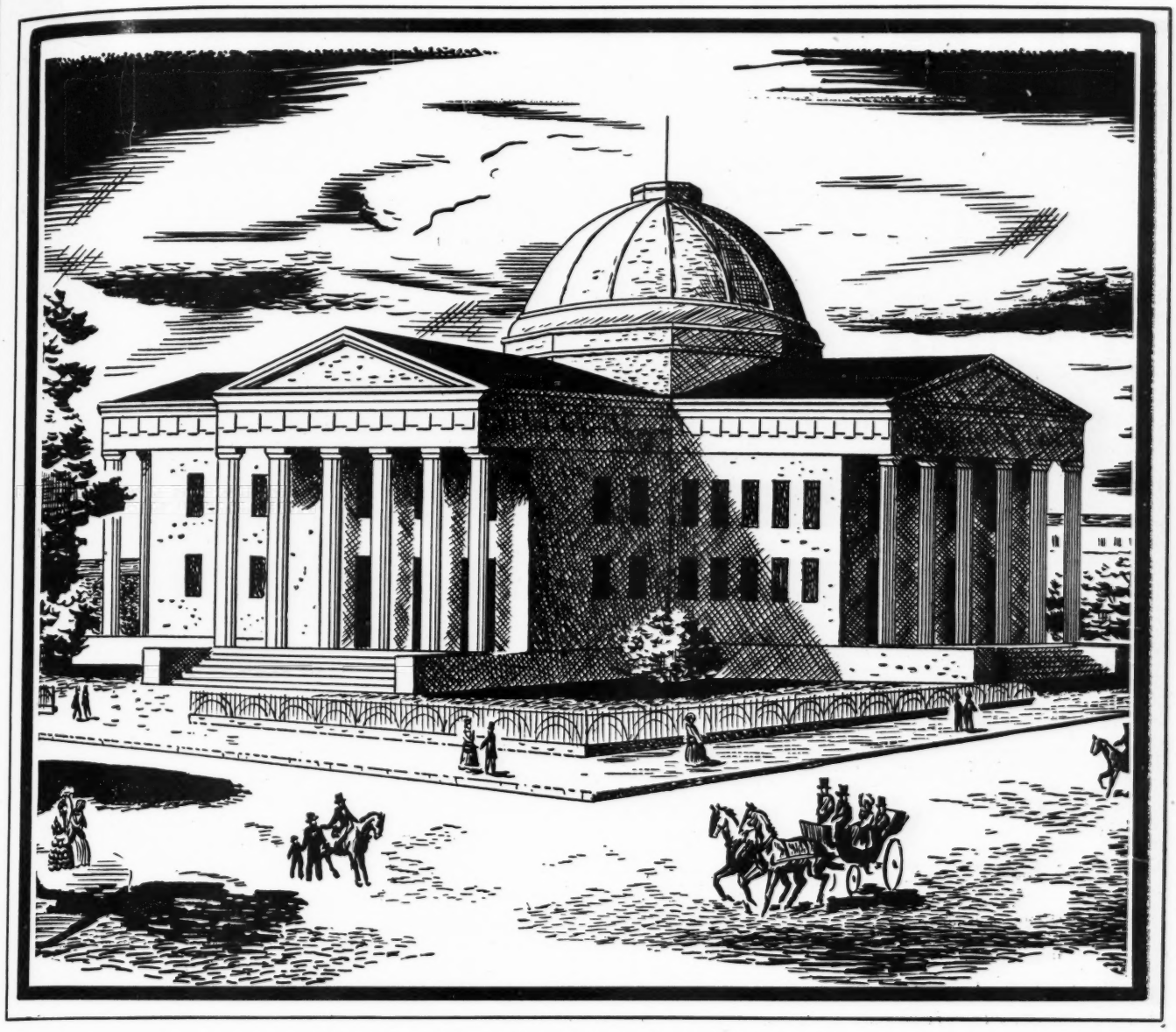
Regardless of the pressure differential and volumetric needs involved, we can provide you with perfect gas regulation.

Write today! Bulletins on all types of Reliance Regulators and Filters are available.

AMERICAN METERS

AMERICAN METER COMPANY
INCORPORATED

1000 MERIDIAN AVENUE, ALHAMBRA, CALIFORNIA



The old courthouse in St. Louis as it looked 100 years ago

St. Louis, Missouri has a cast iron water main in service that was installed more than 100 years ago. That is not surprising as St. Louis is one of our oldest cities, founded by the French and taken over by the U. S. A. with the Louisiana Purchase. Yet this old main is still withstanding the traffic shock and beam stresses imposed by multi-ton trucks and congested underground utility services in a great manufacturing city. More than thirty other American cities have cast iron water and gas mains in service that were installed over a century ago—indisputable testimony to the strength factors of long life inherent in cast iron pipe.

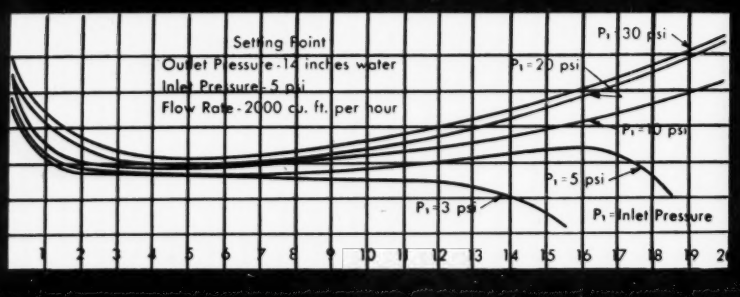
United States Pipe and Foundry Company, General Offices, Burlington, N. J. Plants and Sales Offices Throughout the U. S. A.

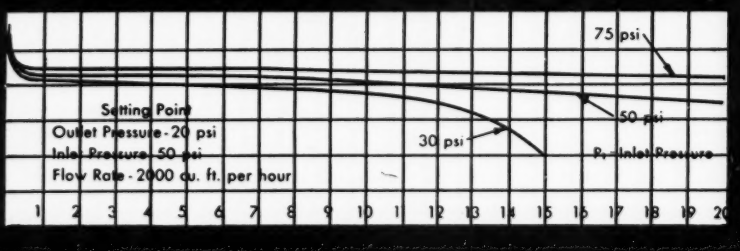
U.S. PIPE

NUMBER TWELVE OF A SERIES

CHAPLIN-FULTON

VERSATILITY and TOP PERFORMANCE with EXTREME SIMPLICITY


Setting Point
Outlet Pressure - 14 inches water
Inlet Pressure - 5 psi
Flow Rate - 2000 cu. ft. per hour
P1 = 30 psi
P1 = 20 psi
P1 = 10 psi
P1 = 5 psi
P1 = 3 psi
P1 = Inlet Pressure



WIDE VERSATILITY—Model 46 controls outlet pressures from a few inches of water to 20 lbs., covering the ranges normally used in distribution, commercial and industrial installations. Also inlet pressures to 125 lbs. and flow rates to 50,000 c.f.h.

TOP PERFORMANCE—The *Dynaknob* principle insures accurate outlet pressure in spite of varying flow rates and varying inlet pressures. Soft valves assure complete shutoff.

The low and high pressure performance charts above indicate the control accuracy.

EXTREME SIMPLICITY—A spring-loaded diaphragm directly connected to balanced valves, reduces to a minimum the service and maintenance requirements.

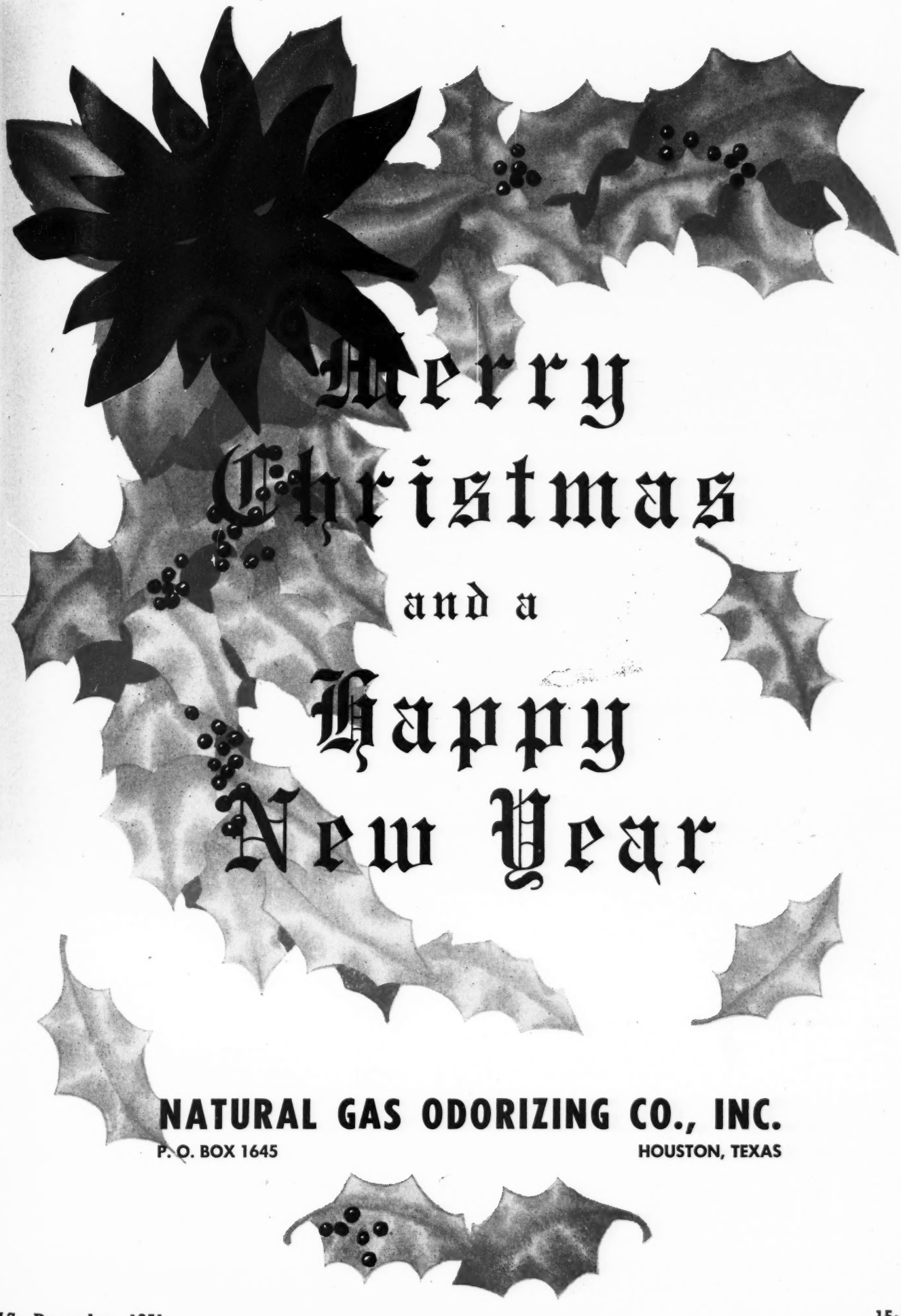
Made in 1, 1¼, 1½ and 2-inch sizes.

WRITE FOR BULLETIN NO. 46

ACCURATE CP MFG CO DEPENDABLE

Chaplin-Fulton

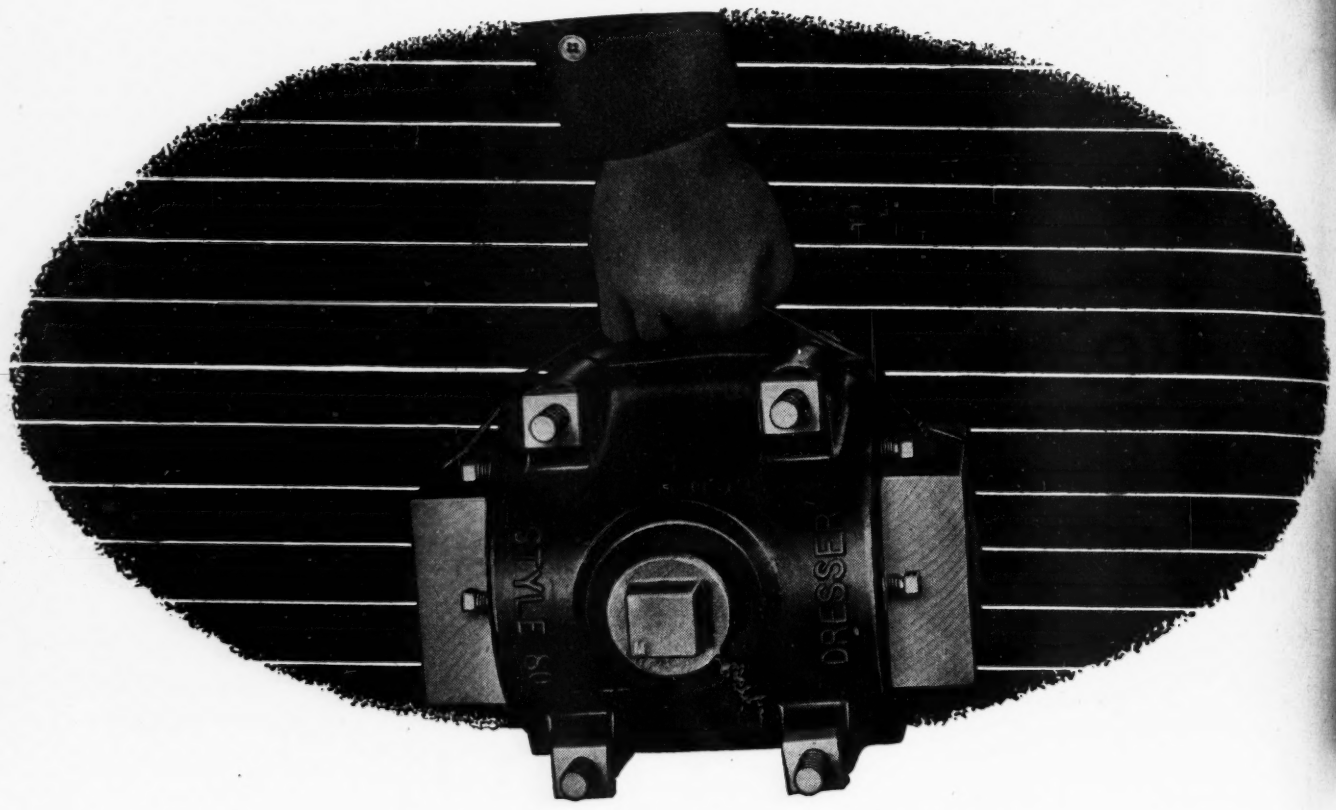
MANUFACTURING COMPANY

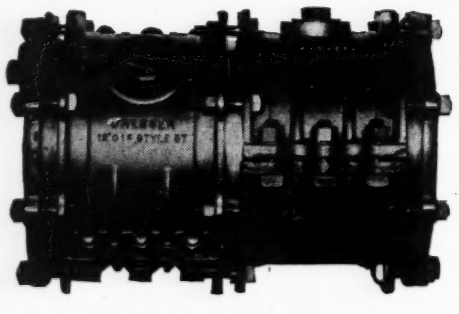


NATURAL GAS ODORIZING CO., INC.

P. O. BOX 1645 HOUSTON, TEXAS

be prepared for a *FAST REPAIR* with this *PACKAGED SLEEVE*





FOR LONGER SPLITS, LARGER SIZES
Dresser Split Sleeve, Style 57C, used singly or in combination (as shown above), encloses breaks, holes, splits in CIP longer than the Style 80 will accommodate. Available in sizes through 12″.

Here's a "packaged" repair sleeve that one man can carry to the job and install in a matter of minutes. It comes to you complete and ready to use—no loose parts. The only tool needed is a wrench.

When you keep Dresser Style 80's in stock, you're ready to handle breaks quickly as they occur. You'll find these low-cost sleeves ideal for tapping purposes, too.

They're permanently tight, even on off-size or deflected pipe, and their resilient gaskets introduce flexibility into your line.

Order now. Sizes 3″ to 8″ CIP.

DRESSER "READY-PACK" REPAIR SLEEVES

Dresser Manufacturing Division, 59 Fisher Ave., Bradford, Pa. • In Texas: 1121 Rothwell St., Houston
In Canada: Dresser Mfg. Co., Ltd., Toronto • Sales offices: New York, Chicago, Houston, San Francisco

Rockwell
SHOWS THE WAY
TO IMPROVED METER PERFORMANCE

All tin meters look pretty much alike—on the outside. It's what's *under* the case that counts. Rockwell tin meters have a host of inner advantages. Consider the important matter of meter capacity. Larger ports and channels are provided in all sizes to boost the safe maximum capacity and reduce pressure loss. Consider, too, the thicker sections of flag wires, flags, and tangents that give increased rigidity—the cranks that are chrome plated for greater wearability—the carefully sewn, wound, treated and aged diaphragms.

Meter cases, themselves, boast many improvements. They are precoated with zinc chromate as a rust inhibitor. Flanges are heavier to guard against leaks. Ample room for full diaphragm movement is provided.

All this adds up to better meter performance with longer life. Get facts about Rockwell tin meters now. Write for bulletin 1020.

Used Coast-to-Coast by America's Leading Utilities

Rockwell

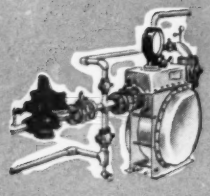
EMCO

TIN GAS METERS

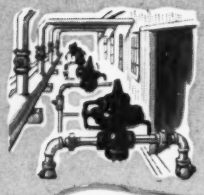
MADE IN BOTH 5 LT. AND 10 LT. MODELS
CAPACITY RANGE FROM 150 CFH to 500 CFH

ROCKWELL

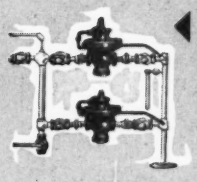
A thousand and one uses IN THE GAS INDUSTRY



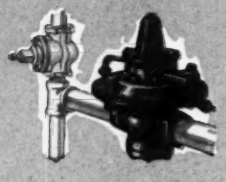
LARGE METER SETTING. Where measurement is made at high or intermediate levels "1001" regulators improve meter accuracy by maintaining constant inlet pressure.



COMPRESSOR STATIONS. The "1001" regulator is widely used to provide a constant pressure on the carburetor or mixing valve in gas engine service.

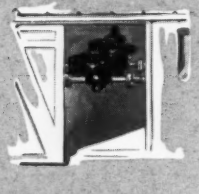


LARGE APPLIANCES. The compact dimensions and extreme sensitivity of "1001" regulators particularly lend themselves to the operation of large heat treating equipment.

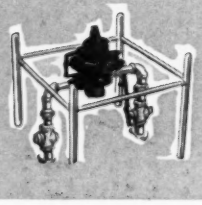


INDUSTRIAL BURNERS. The outlet pressure stability of "1001" regulators particularly benefits the operation of high pressure burners or units requiring a fine degree of temperature control.

DISTRICT PRESSURE CONTROL. These regulators are frequently specified as district controls for systems operating on intermediate pressures or in combination with low pressures.

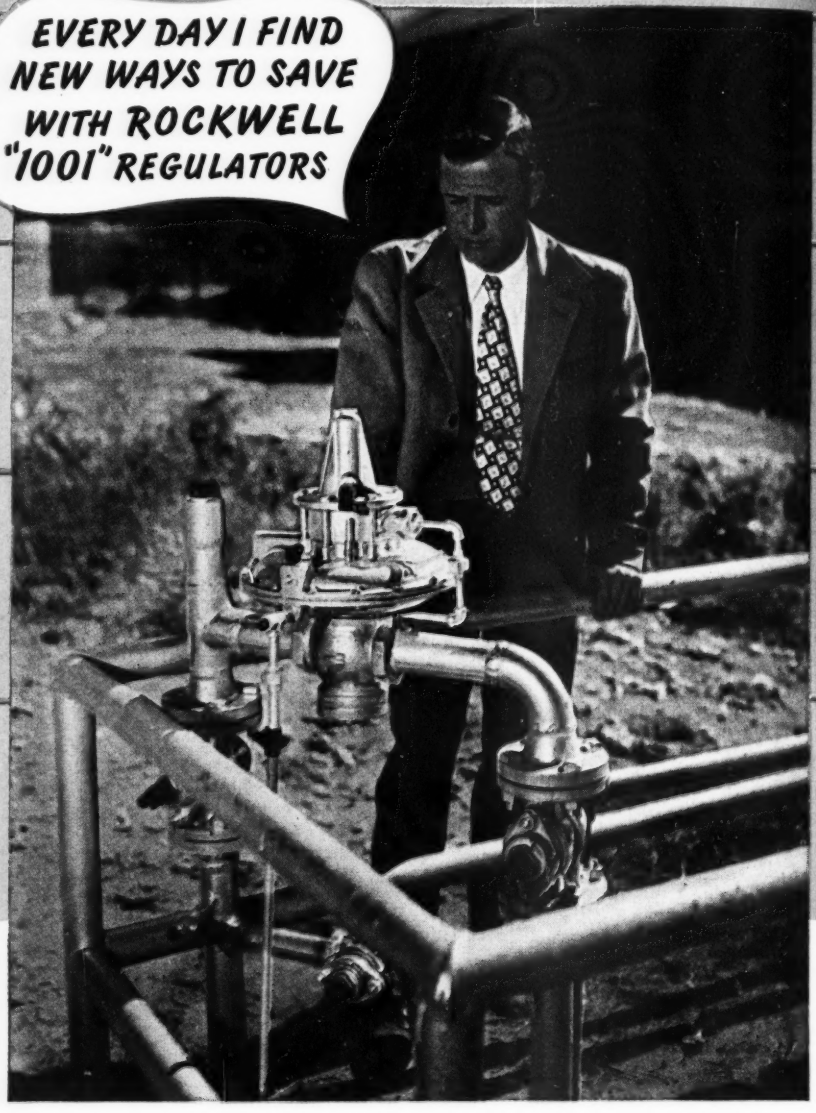


TOWN BORDER STATIONS. Where town border demands do not exceed the capacity of a 2 in. pipe, the Rockwell "1001" regulator has no equal for adaptability and economy.



SMALL DISTRIBUTION SYSTEMS. Everything a distribution man wants has been wrapped up in this small, simple all-purpose design that frequently out-performs larger more specialized types of regulators.

EVERY DAY I FIND NEW WAYS TO SAVE WITH ROCKWELL "1001" REGULATORS



THE HANDIEST REGULATOR IN THE DISTRIBUTION SUPERINTENDENT'S STOCK

This dependable regulator has literally a thousand and one uses. Every day gas men find new applications. Pilot loaded diaphragm provides closest degree of control accuracy. Durably constructed. Economically priced. Wise distribution men now keep several in stock for emergencies. Write for bulletin 1059.

ROCKWELL MANUFACTURING COMPANY

Pittsburgh 8, Pa.

Atlanta • Boston • Chicago • Columbus • Houston • Kansas City
Los Angeles • New York • Pittsburgh • San Francisco • Seattle • Tulsa

Meters

TIN

ALUMINUM

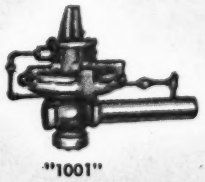
CAST IRON

PRESSED STEEL

Regulators

APPLIANCE

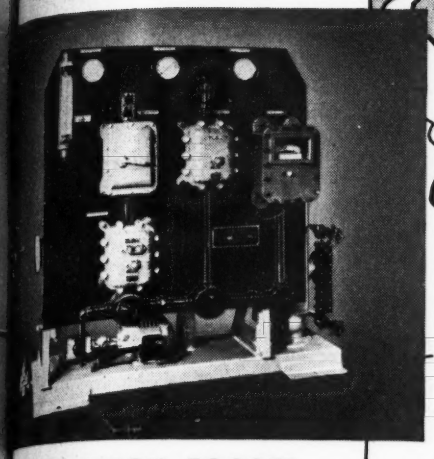
SERVICE



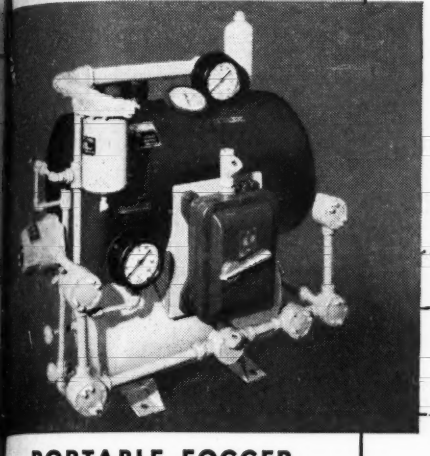
"1001"

BALANCED VALVE

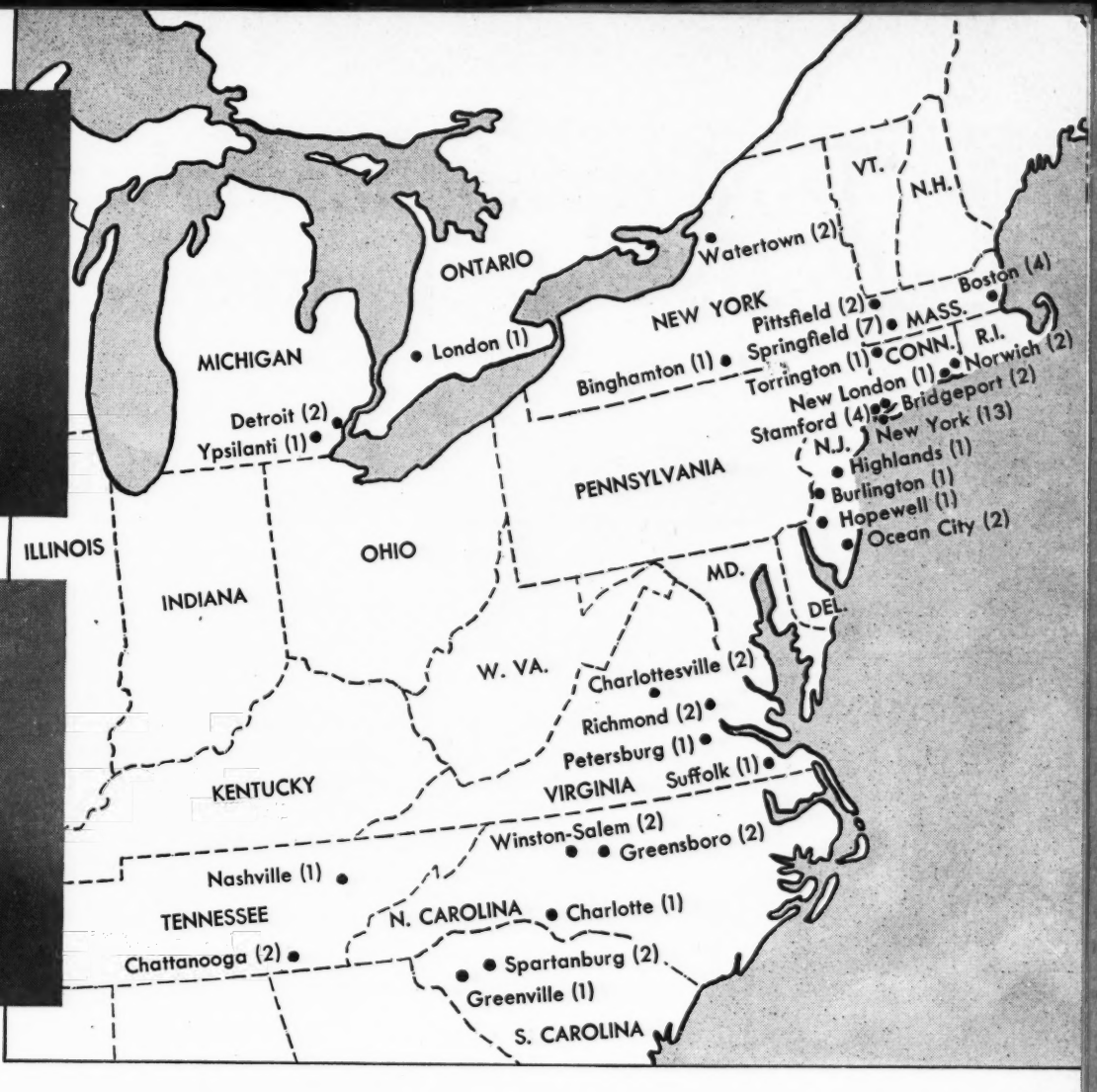
There's a **ROCKWELL METER & REGULATOR** for every use



ELECTROIL FOGGER



PORTABLE FOGGER



PROOF that Gas Companies like the New BLAW-KNOX *Electroil* FOGGER

In less than a year more than 60 distributing points have improved their "customer relations" through the use of Blaw-Knox Oil Foggers.

Both the larger Electroil Fogger and the smaller Portable Fogger are safe, explosion-proof, shop-assembled units which solve many natural gas distribution problems through producing a stable oil fog in the gas stream . . . safely, automatically and with minimum attendance or supervision. Being shop-assembled units, they are ready to be connected "as is" to gas and electric power lines quickly and easily. For comprehensive data—

Write for Bulletin No. 2353.

GAS EQUIPMENT DEPARTMENT

BLAW-KNOX DIVISION

OF BLAW-KNOX COMPANY

2033 Farmers Bank Building - Pittsburgh 22, Pa.

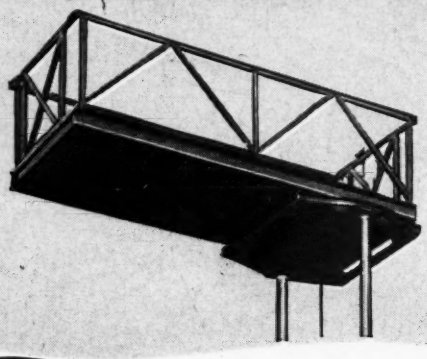
SALIENT FEATURES

1. Simple to install.
2. Easy to operate.
3. Temperature control is completely safe and automatic.
4. Electrical equipment is explosion-proof.

IT WILL:

5. Produce a stable oil fog.
6. Wet down existing dust deposits.
7. Moisten leather diaphragms.
8. Coat inside of pipe with a protective oil film.
9. Prevent loss of odorant from reaction with pipe scale.

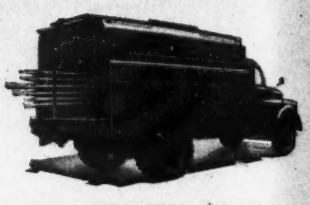
"The Accepted Standard with Utilities Everywhere"



Proved by many years of trouble-free service, *Powers-American* bodies set the pace as the number one choice with utilities everywhere . . . the measurement of top quality and performance throughout the industry. "Job-engineering" steps up crew efficiency, lowers operating costs . . . protects your investment. *Powers-American* has the type body and equipment to do your particular job most efficiently and at lowest cost.

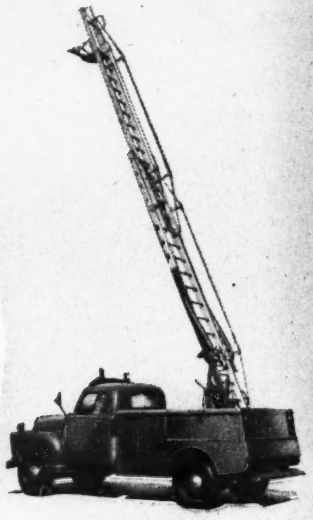
HYDRAULIC TOWER

Platform extends to 30′ above ground and can be revolved full 360°. Operation is controlled from truck cab or by workman on platform. Models are also available in ground-to-platform heights of 21′ and 25′ for installation on chassis having a rated capacity of 1½ tons or more.



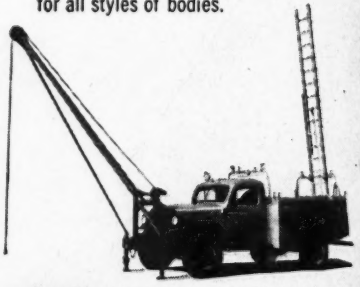
LINE CONSTRUCTION BODY (600)

Available in 9′ to 14′ lengths, equipped to meet individual needs in any phase of utility work.



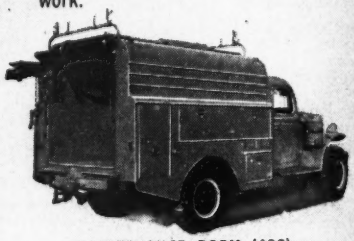
REVOLVING AERIAL LADDER

Models available in working heights of 23′ 6″, 26′ 6″, 30′ 6″, and 32′ 6″ for all styles of bodies.



LIGHT CONSTRUCTION BODY (SERIES 35)

Ideally suited for all types of light duty maintenance and construction work.



MAINTENANCE BODY (400)

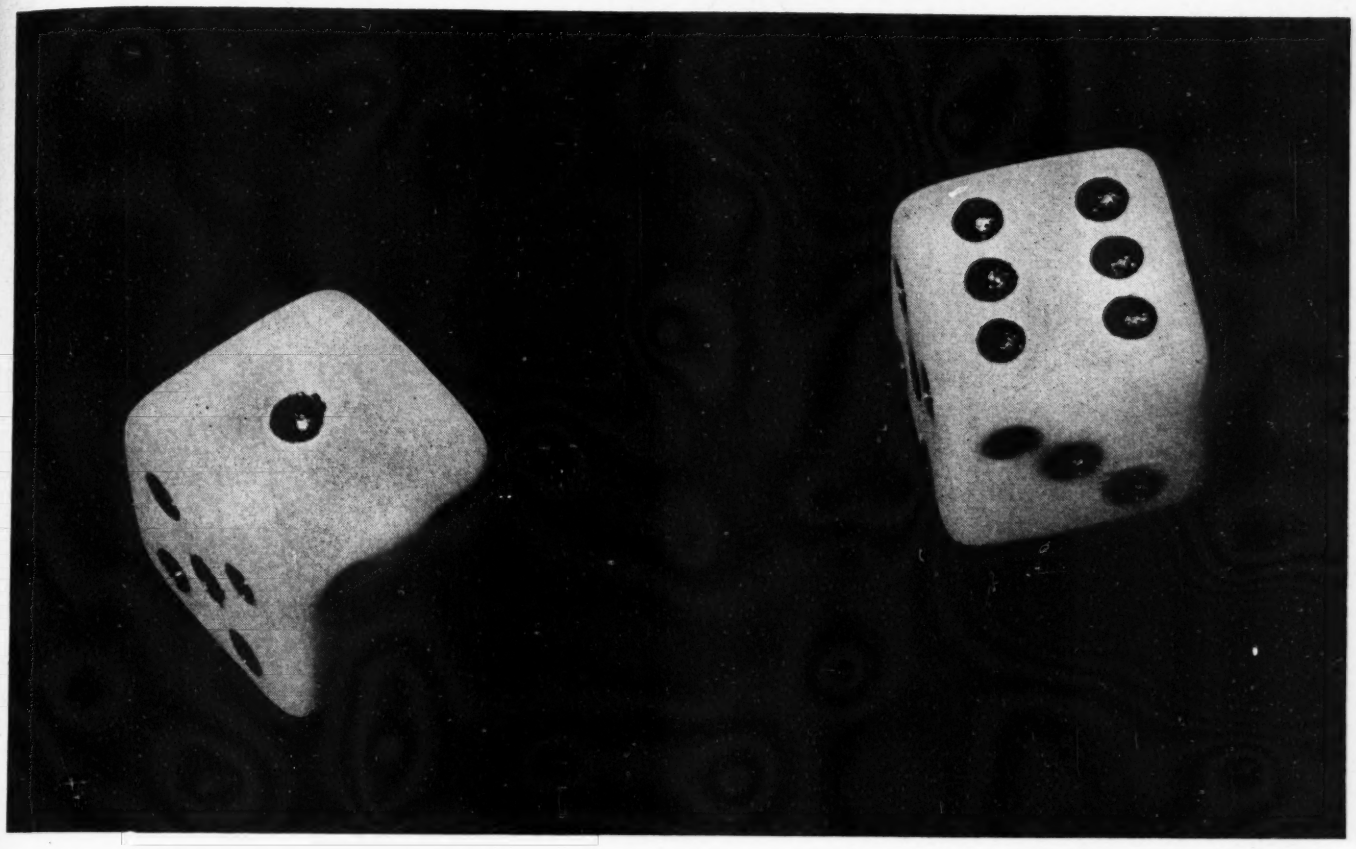
Designed for medium duty general service. May be furnished with winch and derrick capable of handling 40′ poles.

POWERS *American* DIVISION

PUBLIC UTILITY BODIES AND EQUIPMENT

McCABE-POWERS AUTO BODY COMPANY
5904 North Broadway, Saint Louis 15, Missouri

There are many styles of *Powers-American* Bodies not shown here. Write for descriptive catalog today.



A NATURAL...

for Natural Gas!

VULCAN DIAPHRAGMS

If you're shifting to natural gas distribution, remember that VULCAN DIAPHRAGMS in meters, regulators and governors are right at home.

VULCAN DIAPHRAGMS operate with high efficiency in natural gas. They do not dry out and stiffen because they contain no oils or dressings.

VULCAN DIAPHRAGMS save you the periodic expense of oiling. They keep your meter shop clean. They are not messy to handle.

Try time-tested VULCAN DIAPHRAGMS. See what an improvement they are over old-time methods.

VULCAN RUBBER PRODUCTS, INC. MADE IN BROOKLYN, N.Y. BY VULCAN RUBBER PRODUCTS, INC.

VULCAN

RUBBER PRODUCTS, INC.

First Avenue & 58th Street, Brooklyn 20, N. Y.

Pacific Coast Representative: GORDON Z. GREENE CO., 2335 E. 8th Street, Los Angeles 21, Calif.

EXTRA HEAVY CONSTRUCTION

plus 100% Air Testing . . . assures "Super Service"

Cutaway of Dresser Style 90 "Super-Service" street tee. Note how gasket retainer ring assures highest effective sealing power.

Here are the extra rugged service fittings especially designed to "live in the ground" and provide long, trouble-free service. Here is *extra* value for your service fitting dollar.

Every coupling and fitting in Dresser's complete Style 90 line is not only made heavier, but also is air-tested for porosity. Therefore, every Dresser fitting in your stock will be safe to use without an additional test.

To this add the advantage of superior Dresser gaskets, protected and confined by exclusive Dresser gasket retainer rings, and you have service fittings really equipped to give "Super Service". Write today for catalog.

DRESSER "SUPER-SERVICE" FITTINGS

Dresser Manufacturing Division, 59 Fisher Avenue, Bradford, Pa. (One of the Dresser Industries.)
In Texas: 1121 Rothwell Street, Houston. In Canada: 629 Adelaide Street, W., Toronto, Ontario.
Sales Offices: New York, Philadelphia, Chicago, Houston, San Francisco.

S...HIGHLIGHTS...HIGHLIGHTS...HIGHLIGHT

J. ED WARREN TO SUCCEED BRUCE BROWN. The deputy administrator in the PAD will resign next June to return to his regular job as president of Pan Am Southern Corp., a Standard Oil Co. of Indiana subsidiary. Interior Secretary Chapman has announced that the Midland (Texas) oil operator and recently retired president of the Independent Petroleum Assn. of America will step into the Brown shoes.

PORTLAND, SEATTLE SIGN UP FOR NATURAL GAS. After Northwest Natural Gas Co., one of the applicants for a permit to build a line from Alberta to the Northwest, had announced it had signed with Canadian Gulf Oil Co. for a 25-year supply of gas from Pincher Creek field in southern Alberta, the two Northwestern utilities contracted with Northwest Natural as distributors. Gulf's supply pact may become invalid if Alberta permits are not granted by Feb. 14, 1952, and all Canadian federal and U.S. permits are not given by Aug. 15. Gas prices at the field would be set at 10¾ and 11 cents. Eighty billion per year is the average volume contracted for.

GATHERING TAX BONE OF CONTENTION IN TEXAS. The state was having trouble collecting unencumbered contributions from pipeline companies as the new 9/20ths of a cent tax went into effect. Levied on interstate gas systems, the tax was considered in violation of interstate commerce laws by several companies, which paid under protest. Such monies have to be impounded until the matter goes to court--or until 90 days pass if no suits are filed. Of the first $850,000 received, $275,000 was in this category.

THIS THREATENS TO UNBALANCE THE STATE'S BUDGET. It also threatens to upset pipeline company budgets. United Gas Corp., one of those paying without protest, asked FPC permission to pass the tax along in $600,000-a-year rate boosts. FPC refused to permit increases until April 11, pending a hearing.

KANSAS CITY RACKS UP POST-WAR RANGE SALE RECORD. Tying in with AGA's Old Stove Round Up, Gas Service Co. and its dealers sold approximately 2800 ranges from Sept. 17 to Oct. 31. The company sold 805 itself. A big advertising schedule featured a special $30 saving on a completely automatic Roper. Automatics scored heavily: 70% of the company's sales were electric ignition models, 60% of the Roper dealer sales were automatic.

PAD AUTHORIZES MICHIGAN HOUSEHEATING INSTALLATIONS. For Battle Creek (1244), Monroe (740), Lansing (1700), and Albion (231), the administration last month authorized service to 3915 new customers.

FIRST-QUARTER ALLOTMENTS FOR COOKING STOVES TRIMMED. NPA's controlled materials allocations will give range makers 50% of base period usage of carbon steel, 35% of brass mill products and foundry copper, 40% of copper wire mill products, 35% of aluminum. Fourth-quarter shares were 58% on carbon steel, 54% on copper, 46% on aluminum.

CALIFORNIA COMPANIES DODGE COMMON CARRIER ENTANGLEMENTS. Southern California and Southern Counties Gas Co.'s, operators of the Biggest Inch line from the Arizona border to southern California, have substituted a new looping project for one originally blueprinted, in order to keep off public lands and evade the Interior Department's new regulation.

OCTOBER APPLIANCE SHIPMENTS SCORED SUBSTANTIAL GAINS. Range and water heater shipments continued their uptrend (see News section). September-to-October increases for both appliances were better than a year ago, although month-to-month comparison against October 1950 was still unfavorable. Range movements passed the 2 million mark for the year; water heater shipments were close enough to be able to make that figure by year's end.

SOUTHEAST AGAIN PRESSES DEMANDS FOR NATURAL GAS. A tentative contract for a supply of natural gas from South Georgia Natural Gas Co. was signed last month by the city of Tallahassee, Fla. Reportedly, South Georgia has been promised adequate volumes by Southern Natural Gas Co., Birmingham, if enough cities in the area would sign up. Georgia Public Service Commissioner Walter McDonald thought a small-scale system might prove feasible, previous plans having been on too large a scale and requiring more industrial load than could be obtained.

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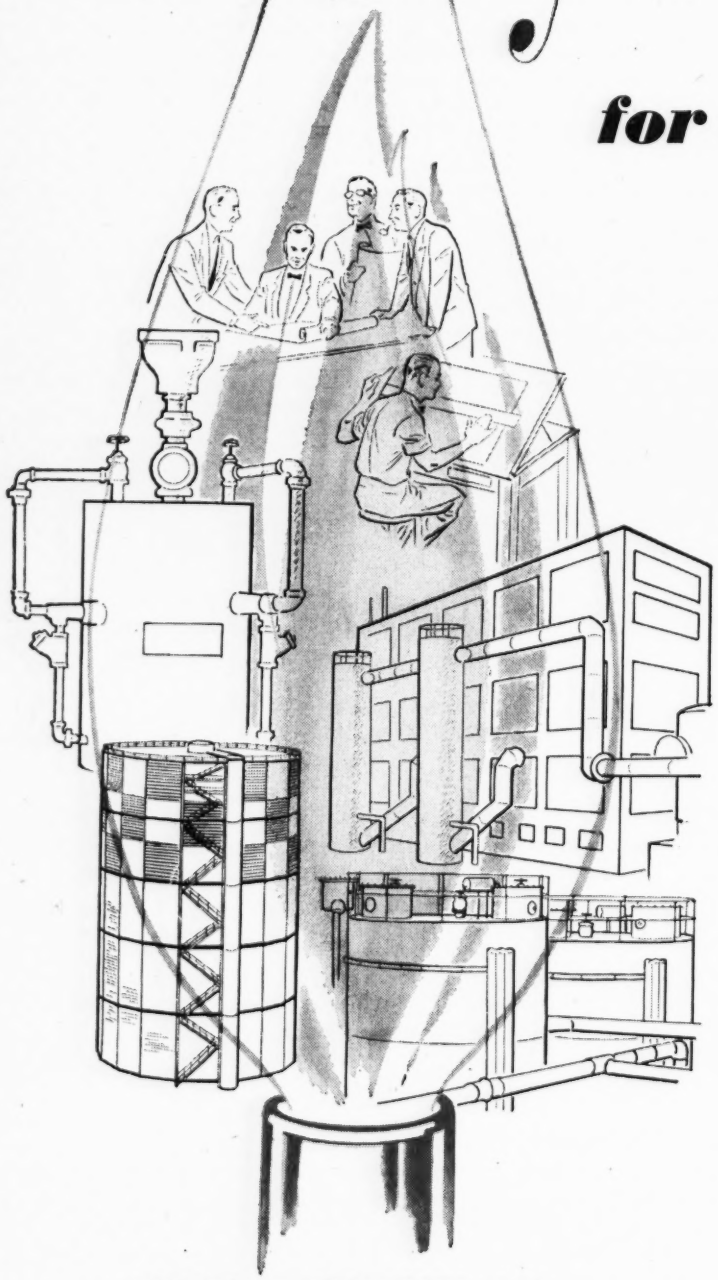

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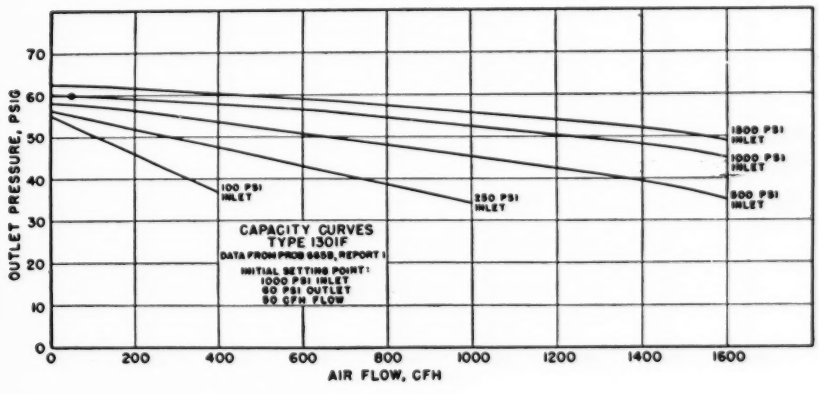

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